JULY, 1961

RSGB BULLETIN

VOL. 37, No. 1

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R.S.G.B. BULLETIN

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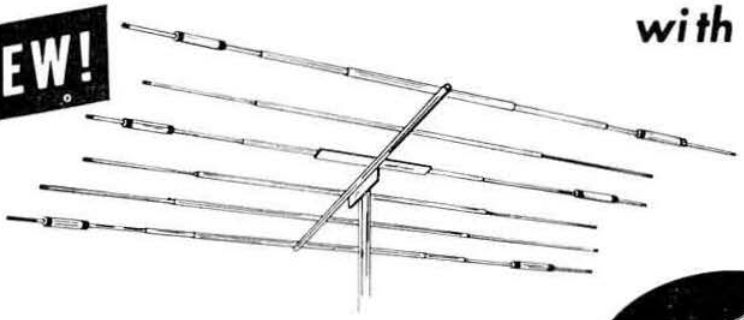

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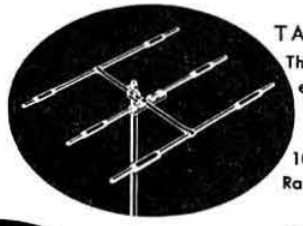

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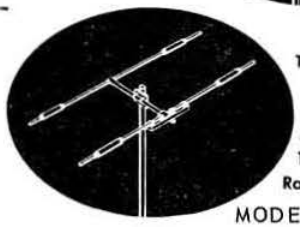

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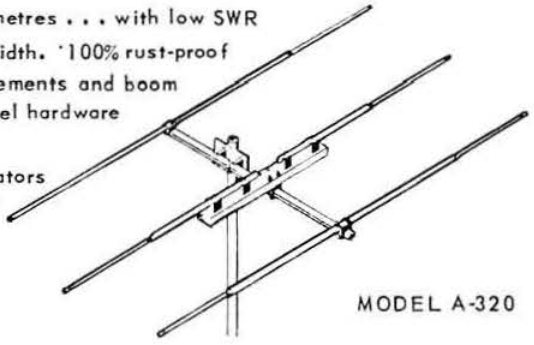

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Current Comment

discusses topics of the day

Reflections

FOR the past 36 years this Journal has provided members with a wealth of up-to-date technical and topical information.

Way back in the summer of 1925 it required courage to launch a new *printed* monthly publication devoted exclusively to a scientific hobby. In those now far-off days it is doubtful whether the total membership of the Transmitter & Relay Section of the Society exceeded 500, yet the *T & R Bulletin* (as it was then called) very quickly became an integral part of the Society. Bevan Swift, Gerald Marcuse and J. A. J. Cooper—all of whom are no longer with us—will always be remembered by the old timers as the persons chiefly concerned in bringing the *Bulletin* to fruition.

The T & R Section, which grew out of a fusion of interests between various groups of people interested in amateur transmitting problems, in due time absorbed the parent body so that by the mid-twenties the Society had become recognized for international purposes as the National Amateur Radio organisation in the United Kingdom. In later years it extended its field of interest and influence into many parts of the British Empire.

The coming of international DX undoubtedly provided the spur which lead to the need for a virile monthly publication dealing with the activities of amateurs generally. Up to that time the Society had been dependent upon—and will always be grateful to—the *Wireless World* for giving publicity to its affairs. It was very largely due to the *Wireless World*—celebrating its 50th anniversary this year—that the historic Trans-Atlantic tests of 1921/22 and 1922/23 received such wide-spread support, and it was the *Wireless World* a year or two earlier that helped to overcome the delays which were occurring in the reissue of experimental licences after World War I.

It is a pleasant thought that the ties of friendship which existed 40 years ago between the *Wireless World* and the R.S.G.B. are as strong today as they were then. It is a well-known fact that a hobby organisation—whatever its interests—must, if it is to succeed, work in close harmony with its associated professional, scientific and official bodies. The years that have elapsed since the ending of World War II have clearly demonstrated in a hundred ways how closely radio amateurs work with professional, scientific and official bodies whose interests run parallel with their own.

The space age has already provided amateurs of the United Kingdom, the United States, and other countries with opportunities for co-operation with scientific bodies and further opportunities will continue to present themselves.

In the twin fields of ionospheric and tropospheric research the Society has been able to make useful contributions to scientific knowledge, in which connection the frequency accuracy of the Society's V.H.F. Beacon Station at Wrotham Hill has earned well-deserved praise from professional radio engineers.

The tremendous interest being shown in mobile operation—as at June 30, 1961, no less than 1,043 /M licences were in force—has led to important advances in the design and operation of mobile equipment and aerial systems, all of which will attract the attention of those who, in the long run, will have most to do with the continuation—and we hope the ultimate extension of—the Amateur Radio movement in the United Kingdom.

The beginning of a new volume is a good time to reflect on what has been attempted and achieved in the past and to speculate on the future. Certain it is that Amateur Radio in a national as well as an international sense has never been stronger than it is today with literally thousands of newcomers joining the movement each year. If there is one fear in the minds of the old timers, it is that the newcomers may find it all too easy and will, as a consequence, miss many of the thrills that made Amateur Radio such an exciting hobby in past years. On the other hand, if they look around, the newcomers will discover as many new fields to conquer as did those who laid the foundations of the hobby nearly 50 years ago. In all these activities the R.S.G.B. will continue to provide members with up-to-date technical and topical information.

J. C.

Loaded Wire Aerials

By F. J. H. CHARMAN, B.E.M. (G6CJ)*

HAVE you ever heard of a 14 Mc/s dipole which must be made 100 ft. long, instead of the usual 33 ft., before it comes to resonance? In this article it is proposed to show how such " stretched " aerials can be made and some of the ways in which they may be useful.

The Principle

In order to understand how this seeming magic can be performed, it will be helpful to start with an equivalent circuit. Fig. 1 shows a half-wave dipole and two ways of representing it as a lumped circuit. The wire has distributed

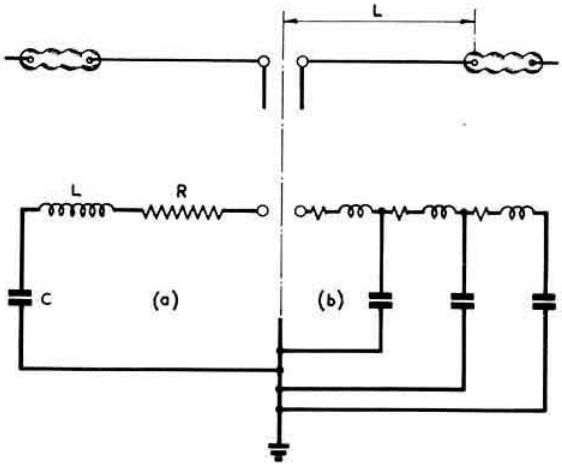


Fig. 1. Balanced half-wave dipole and lumped equivalent circuits. (a) Single section = one half: (b) Multi-section = one half.

series inductance (L) and shunt capacitance (C). The field of the capacitance can be considered to terminate on an " earthy " bisecting plane whence it continues symmetrically to the other half of the dipole. The radiation resistance is also represented by resistance (R) in series with the inductance. Side (a) has been represented by one single mesh of LCR, and the network can be variously considered as a closed resonant circuit or as a half section of low-pass filter, with all the damping in the coil. The image impedance of the filter ($Z_0 = \sqrt{L/C}$) corresponds to the characteristic impedance of one half of the aerial.

The single LCR is a poor approximation to the aerial, but if the aerial is divided into three or more sections, the representation (b) of the right-hand side is much better and enables reasonable estimates of the " free-end to earth " or " parallel " impedance of the aerial. With many sections the circuit approximates a lossy transmission line. If the quarter wave of aerial is divided into three sections of electrical length 30° the equivalence is fairly good, and in the aerials to be described these 30° or $\lambda/12$ sections will be used and treated as " lumped " component sections.

The reactance of the equivalent coil of a 30° section is Z_0 tan 30° ohms, and for the value of Z_0 for one half of the dipole one can use:

$$Z_0 = 138 \log (4L/D) - 60 \text{ ohms.}$$

where L is the half length of the aerial and D is the wire diameter. Since the principle is being explained in terms of one half of a balanced aerial, it may be less confusing to consider it as a quarter-wave vertical erected over an earth plane, in which case its radiation resistance (at the base) is 35 ohms.

If the aerial had a uniform current along its length (instead of a standing wave) then its radiation resistance would be 120 ohms per half wavelength, and hence the value of R would be 30 ohms per 30° section in Fig. 1(b). This is practically independent of Z_0 but the three-section filter has heavy attenuation, and so the total input resistance at resonance is less than 60 ohms—one might say, 20 + 10 + 5, making it 35!

Series Loading

The quarter wave represented by Fig. 1(b) requires three 30° sections for resonance. Now suppose that in series with each inductance a capacitance (Fig. 2) of such value is inserted that two-thirds of the inductive reactance is cancelled—namely a capacitive reactance of (2/3) Z_0 tan 30°. This is equivalent to reducing the sections from 30° to 10° and clearly it will take nine such sections to reach quarter-wave resonance. The aerial has thus been " stretched " by a factor of 3 : 1.

What has become of the network? It was originally a low-pass filter: now in Fig. 2 it is one of the known types of high-pass filter, and with the aid of filter theory it is found that the image impedance (mid-series for the feed point) has been reduced three times. Further, in the equivalent aerial there are now nine 20 ohm radiating elements and it is therefore to be expected that the radiation resistance of the aerial would rise about three times to, say, 100 ohms.

The characteristic impedance of the aerial corresponds in fact to the reactance of the coil of Fig. 1(a), and hence Z_0/R is the Q of the aerial. The effect of loading is that Z_0 is lowered and R is effectively raised, and hence the Q of the loaded aerial is very low: the aerials to be described have a Q approaching unity and hence are very wide-band affairs. A practical value of Z_0 for a wire quarter-wave 14 Mc/s aerial is 600 ohms. When loaded by a factor n = 3 this becomes 200 ohms and the radiation resistance 100 ohms. If the loading were increased to four times the aerial would be almost critically damped or aperiodic.

The above analysis is quite rough but nevertheless practical

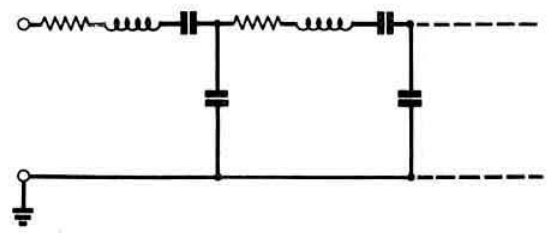


Fig. 2. Equivalent aerial sections with series capacitance loading.

aerials behave very much as this theory indicates. It only remains to consider what advantages they may have, and a simple way to construct them.

Construction

The obvious method of construction is to insert insulators

TABLE 1

14 Mc/s Dipoles; 5 ft. 6 in. Sections

n	C(pF)	No. of Sections	Dipole Length Ft.	Input Z	Beam-width	Gain
1	—	2 × 1	33	70 ohms	78°	0 db
2	68	2 × 6	66	200 ohms	56°	1 db
3	50	2 × 9	99	400 ohms	42°	2·1db
4	43	2 × 12	132	550 ohms	32°	3·2db

For other bands change C and section length proportional to wavelength e.g. for 21 Mc/s take two-thirds values given, for 28 Mc/s, half.

* *Pleasant Cottage, Guildford Road, Lightwater, Surrey.*

at 30° electrical spacing (5 ft. 6 in. for 14 Mc/s) in a wire aerial and then to bridge each insulator with the appropriate capacitor. The insulator need not be special, as the aerial is highly damped by radiation; varnished resin board will do. The capacitors must withstand exposure; if the aerial is to be used for transmitting they must also handle power, and therefore should be of the stacked mica foil, and not the silvered mica, type. They must be connected by flexible leads. Values are given in Table 1, but are not critical because this is a wideband aerial. Aerials made in this way perform as expected but present rather a " Christmas tree " appearance, and are expensive, requiring 18 good capacitors for a " three times " dipole. A far more elegant and much cheaper method is to use 80 ohm flat twin feeder as the aerial wire, cutting alternate wires to leave the correct overlapping lengths to form the capacitors. This is illustrated in Fig. 3. The

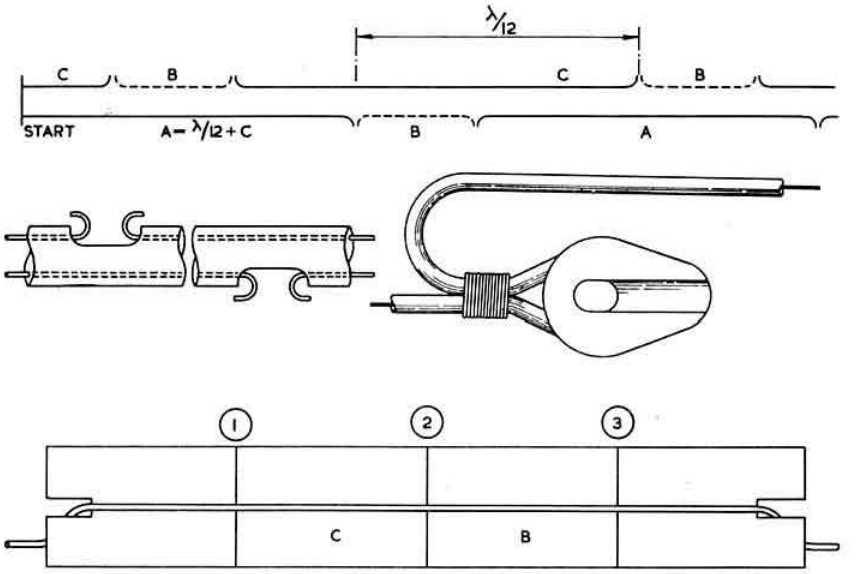


Fig. 3. Details of construction from 80 ohm flat twin line. The upper diagram shows how the two conductors are cut to produce overlapping sections of the required length. The lower diagram shows a marking board. The inner diagrams show details of the cuts and the method of holding ends on insulators. Dimensions are given in Table 2.

capacitance between conductors of a twin line is $100\sqrt{K}/3Z_0$ pF per centimetre, where K is the dielectric constant, i.e. about 1·6 pF per inch for 80 ohm polythene line. The actual cutting must be done carefully and systematically because one wrong cut may ruin a long length of feeder.

The following notes, together with Fig. 3, give details of a procedure which should avoid such accidents. The basic length of each section is $\lambda/12$. The lengths marked *C* are the capacity overlaps; since the whole $\lambda/12$ is not needed for *C*, there is a " dead " wire section *B* which is not used but is left in. The cuts, illustrated in Fig. 3, are made with a sharp knife, taking care to expose only one wire each time. These cuts can be about ⅜ in. long; the exposed wire is cut and folded back as shown to hold tension.

Before cutting, the points should be marked out along the length of cable, and then checked. The marking board is ruled with lines 1, 2, and 3 spaced according to Table 2, and is provided with a slot at each end so that the cable can drop down and be held flat. It will help if the cable is reeled between two cable bobbins.

The start of the cable is placed on line 1 and points 2 and 3 are marked on the *far* side, by small nicks or by blobs of quick drying cellulose paint. The cable is now moved to the left until mark 3 falls on line 1, after which points 2 and 3 are marked on the *near* side of the cable. This alternation proceeds along the entire length of cable.

When the cutting is completed all exposed wire ends should be protected against damp by a heavy coat of tacky varnish or bitumastic paint. At the terminal end both wires *A* and *C* should be cleaned and joined to the feeder. Table 2 gives dimensions for four bands and three different loadings. These are based on experimental results and are for 80 ohm twin with 20 s.w.g. (0·036 in.) conductors (e.g. B.I.C.C. T.3066).

TABLE 2

Dimensions in inches for cutting 80 ohm twin with 20 s.w.g. (0·036 in.) conductors. Note: B and C = λ/12.

Freq.	7 Mc/s		14 Mc/s		21 Mc/s		28 Mc/s	
λ/12 =	132 ft.		66 ft.		44 ft.		33 ft.	
—	C	B	C	B	C	B	C	B
$n = 2$	87	45	47	19	33	11	26	7
$n = 3$	62	70	33	33	23	21	18	15
$n = 4$	54	78	29	37	20	24	16	17

Radiation Patterns

The loaded dipole is very much like a collinear array but, of course, is much simpler as there are no feeding and phasing complications. On the other hand, whereas the collinear array approximates a uniform current distribution, the loaded wire tends towards an exponential current distribution. The difference in radiation pattern is that whereas the collinear array has sidelobes, the loaded wire has a slightly broader beam for the same length of aerial but *no sidelobes*. Theoretical patterns for loading factors of $n = 2$, 3 and 4, are given in Fig. 4, and practical models have been found to have very similar performance. These diagrams represent the horizontal patterns of horizontal aerials, but the upper half pattern would be that of the vertical or ground-plane version.

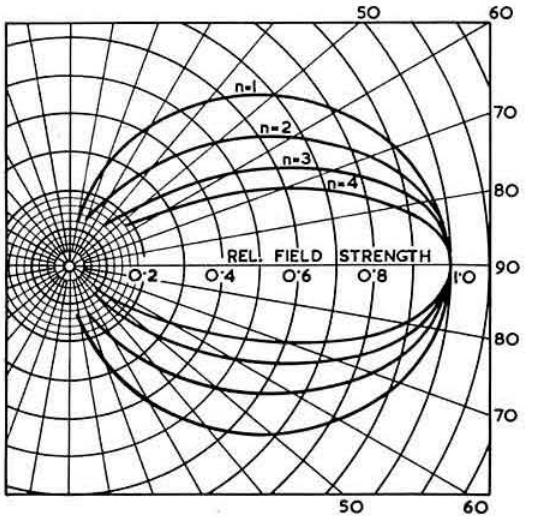
Horizontal Aerials

A dipole with a stretch factor of two is equivalent to a full-wave dipole but has advantages. The centre impedance is about 200 ohms and it can be fed with 250 ohm twin feeder. It will not work at all at lower frequencies, but will still radiate well at higher frequencies, as it tends to degenerate into a simple long wire aerial, the series capacitances becoming less effective. For a 14 Mc/s aerial, the v.s.w.r. at 21 Mc/s is about 3 : 1 but at 30 Mc/s it will be 5 : 1 and a multilobe long-wire pattern will appear.

A three times dipole has a higher impedance, 400 ohms, and although 250 ohm ribbon could be used, an open wire line would be better. At 28 Mc/s the v.s.w.r. on a 400 ohm line would be about 2·5 : 1.

Vertical Aerials

The horizontal loaded aerial is seen to have useful features, but in the vertical application the loaded aerial is also quite attractive. It has only been made in the flexible form de-



$$\frac{E}{E_o} = \frac{\cos\left(\frac{n\pi}{2}\cos\theta\right)\sin\theta}{1-n^2\cos^2\theta}$$

Fig. 4. Radiation patterns of loaded dipoles for load or "stretch" factor n. $n = 1$ is a plain wire half-wave dipole. Beamwidths are; $n = 1$, 78°; $n = 2$, 56°; $n = 3$, 42°; $n = 4$, 32° and gains are 0, 1·5, 2·5 and 3·5db respectively.

scribed above and as such, needs a " sky hook ". A rod form could be made with a 2 : 1 loading but a higher ratio is not practicable because the lower Z_0 of a rod makes the radiation load heavy and the current attenuates too rapidly.

A single stretched quarter-wave can be used with a ground plane, and a study of Fig. 5 shows that such an aerial has very low angle radiation and good discrimination (in the receiver) against short skip high-angle interference. It is unlikely that many readers will be able to suspend more than a two $\lambda/4$ for 14 Mc/s (33 ft. high) but the alternative collinear aerial would be very difficult to design.

The main reason for using a ground-plane with a normal quarter-wave aerial is because the alternative earth connection is very inefficient. A single spike earth may introduce about 50 ohms loss into the aerial. Since the radiation resistance is only 35 ohms, more than half the power fed to the aerial would be wasted in soil heating. An extensive earth mat of several wires may only reduce the loss to 20 ohms.

Now if the aerial itself has a high radiation resistance, then such earth losses are relatively unimportant. The loaded aerial can therefore be used quite effectively against a moderate earth connection. The impedance of a double quarter-wave is about 100 ohms, and 80 ohm coaxial feeder could be used: the triple quarter-wave is about 200 ohms and a matching transformer is needed. The writer was able to support a triple (50 ft.) 14 Mc/s vertical, and erected a driven pair, phased like the G8PO aerial (135° phasing and spacing). A Band 3 TV aerial made in the same way had a gain of 6db or more from 180 to 220 Mc/s with a vertical beam-width of $\pm$ 17°. The 14 Mc/s version could not be measured but it certainly was powerful.

Trump Card

One feature of the loaded wire aerial is very useful and quite unique. The phase velocity is n-times greater than that of a plain wire (where n is the loading or stretch factor).

This does not mean that the wave travels faster than light, but it is a way of saying that the standing waves are n times longer. For this reason the loaded wire will not be affected by a plain wire laid parallel to it. No coupling effects are noticed until the two are so close that the equivalent aerial capacities become affected. This means that a 14 Mc/s loaded aerial can be hung about a foot below a 7 Mc/s wire dipole, using the same supports (Fig. 5). Further, it can be joined to the same feeder: at the lower frequency of 7 Mc/s the wire aerial has low impedance and the loaded aerial high, so all the 7 Mc/s power goes to the wire. At 14 Mc/s the wire is full-wave and very high impedance, but the loaded wire accepts power.

The television aerial mentioned above was actually supported a few inches either side of a Band 1 dipole and the

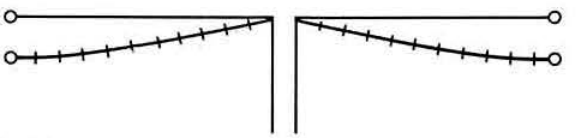


Fig. 5. Showing how a loaded wire 14 Mc/s aerial can be assembled on the same supports and feeder as a plain wire 7 Mc/s dipole.

two aerials were quite unaffected by each other. An aerial of this type has actually been made to work suspended inside the frame of a steel tower—but for such drastic treatment the design must be modified.

End-Fire and Vee Aerial

The loaded wire can also be used as an end-fire terminated aerial, but as such is very different from a long plain wire, which has a multilobe pattern. With the loaded wire there is

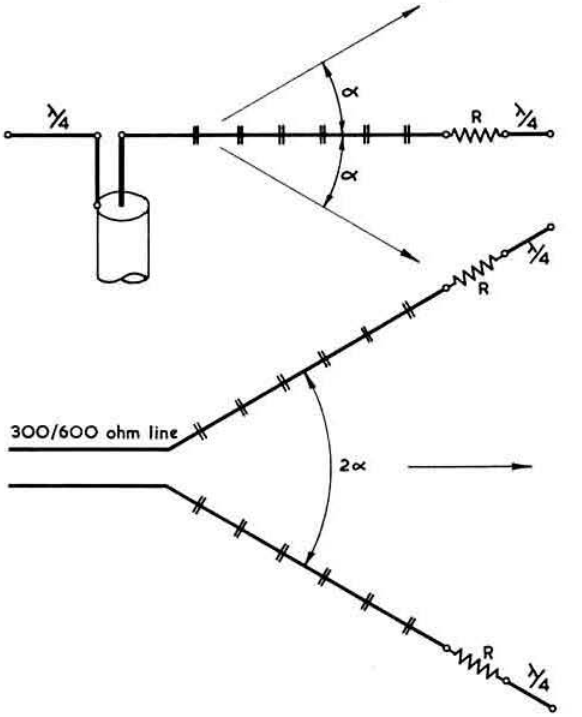


Fig. 6. Terminated end-fire aerials. The angle α depends only on the loading factor n; the gain is proportional to length. The following figures are typical:

			Length λ	Gain 3db
$n = 2$	$\alpha = 30°$	R = 300 ohms	1½λ	5
$n = 3$	$\alpha = 20°$	R = 200 ohms	2 λ	6
$n = 4$	$\alpha = 15°$	R = 150 ohms	3 λ	10

one main lobe of radiation (conical about the wire of course) at an angle depending on the load factor *n*. The gain is proportional to length but the beam angle is constant. The far end of the aerial is terminated by a suitable resistance (Fig. 6) connected between the end of the aerial and a quarter-wave artificial earth wire.

The single wire version in the upper diagram is the basis of the old E.M.I. tilted wire TV aerial, but needs an impedance transformer (not shown) and a coaxial line. The Vee aerial can be fed with a balanced line of impedance *2R* as given with Fig. 6. The gain figures shown are basic, but much higher effective gains are obtained over long distances because of the low angle projection of the main beam.

Acknowledgments

The fundamental principle of the aerials described was discovered many years ago by E. C. Cork of E.M.I. Electronics while the author carried out some of the applications discussed. The invention and its applications were covered by patents, some of which are still valid.

Northern Mobile Rally

THE fourth Northern Mobile Radio Rally was held at Harewood House on May 28 by kind permission of H.R.H. The Princess Royal and was attended by 900 visitors who arrived in 240 vehicles, of which 80 were fitted for /M operation. Members of the Hetton (Co. Durham) and Royston (near Barnsley) Amateur Radio societies came by coach. The Army Apprentice School (Harrogate) Amateur Radio Club arrived in two vehicles.

As at most rallies, the majority of mobiles were equipped for Top Band and G3MMK/A, the talk-in station, worked 70 of them. A few were on 2m.

The attractions included a " cake weight " competition, a lucky dip for juniors, a junk stall presided over by G2FCP and a novelty stall run by G3JWN and G3HPD which sold out in 50 minutes! A novel competition required entrants to put 10 mobile operating and road safety points into order.

The rally was organized by Messrs. H. Brooke (G3GJV/M), J. Charlesworth (G3IJC/M) and M. Firth (G3MMK) on behalf of the Spen Valley Amateur Radio Society.

Harlow Mobile Rally

MEMBERS of Harlow and District Radio Society held a successful rally at Magdalen Laver, Essex, on June 11, attracting an attendance of about 400. Among the visitors was SM4CKL. The talk-in stations were G3ERN/P on Top Band and G3JMA/P on 2m.

As visitors arrived, they were welcomed by G6UT and their names entered on the raffle list, the principle prize being a Mic. 45 microphone. Another raffle was for a 24 hour zone clock while a treasure hunt was also very popular. The prize for the longest distance travelled to the Rally went to G3HES of Stamford.

A welcome innovation was a " hot dog " stand arranged by G3ONE. Music was provided by G2ARN and G3JVI.

Q Multiplier

COILS for the *Q* Multiplier described in the August 1959 issue of the BULLETIN and in the eighth edition of *A Guide to Amateur Radio*, can no longer be obtained from Osmor Radio Products, but Electroniques (Felixstowe) Ltd., Radio Works, Bridge Road, Felixstowe, Suffolk, are able to supply these items at a cost of 6s. 6d. each, plus 6d. postage.

DERBY MOBILE RALLY AND HAMFEST

Rykneld Schools, Derby

AUGUST 12-13, 1961

On Saturday, August 12, there will be an official visit to the Fifty Years of Radio Exhibition at the Art Gallery, Derby Museum, followed by a barbecue and open-air dancing in the school grounds. The programme on Sunday, August 13, will include a Mobile Treasure Hunt, Model Aircraft Display, Children's Sports and Film Show, Prize Draw for refrigerator and many other gifts. Refreshments and ice cream will be available.

Visitors wishing to bring caravans should contact the Organizer, Tom Darn (G3FGY), 44 Laurel Avenue, Ripley, Derbyshire, in advance.

Organized by the Derby and District Amateur Radio Society and Derby Short Wave Experimental Society.

HETTON SHOW AND MOBILE RALLY

Hetton Moor Farm, Easington Lane, near Houghton-le-Spring, Co. Durham.

SATURDAY, AUGUST 26, 1961

Attractions will include show jumping, brass band contest and Northern Command Display and Gymnasium Team. Visitors wishing to enter the many contests may obtain entry forms from S. L. McAteer (G3CKC), 20 Kirkdale Street, Low Moorsley, Hetton-le-Hole, Co. Durham. A prize will be offered for the best piece of home constructed equipment on show and prospective entrants should send details to G3CKC in advance.

SOUTH MANCHESTER AND STOCKPORT AMATEUR RADIO RALLY

The Pavilion Gardens, Buxton

SUNDAY, AUGUST 27, 1961

The main event will be a radio mobile and navigation competition starting from the Davenport Theatre Car Park, Stockport (on the A6) at 13.45 B.S.T. There will be a similar competition for cars not fitted with radio transmitters.

Those not taking part in the competitions may proceed direct to Buxton where meals will be available up to 5.15 p.m. and light refreshments until 10 p.m. Attractions will include closed circuit TV demonstrations, exhibits by the Police, Civil Defence and Post Office, miniature model railway, boating lake, band and illuminated gardens after dusk.

Cars displaying the official " sticker " will be admitted to the reserved car park in the Gardens at an inclusive charge of 2s. 6d. Stickers may be obtained at the Davenport Theatre Car Park on the day of the Rally, at the entrance to the Pavilian Gardens, or by post from C. M. Denny (G6DN), 18 Willoughby Avenue, Didsbury, Manchester 20.

RALLY STATIONS

1920 kc/s—G6NM/A at Stockport until 13.30 B.S.T.
1950 kc/s—G3FVA/A at Buxton until 16.00 B.S.T.

Organized by the South Manchester Radio Club and the Stockport Radio Society.

NATIONAL MOBILE RALLY

Woburn Abbey, Bletchley, Buckinghamshire

(by permission of His Grace the Duke of Bedford)

SUNDAY, SEPTEMBER 10, 1961

* State Apartments open.
* Park of more than 3,000 acres and 2,000 animals.
* Children's Playground, Pets' Corner and Boating Lake.
* Restaurant, Snack Bar and Boating Lake.
* Special Rally Car Parks.

Organized by the R.S.G.B.

LINCOLN HAMFEST AND MOBILE RALLY

North Kesteven Grammar School, Newark Road, North Hykeham, Lincoln.

SUNDAY, SEPTEMBER 17, 1961

Attractions will include a travel film show by Dr. A. C. Gee (G2UK), children's sports and sale of surplus equipment. The new venue will be well sign-posted and there will be plenty of parking space.

Organized by Lincoln Short Wave Club.

Mobile Licences

MEMBERS holding a Mobile Licence who would like that fact to be recorded in the 1962 edition of the *R.S.G.B. Amateur Radio Call Book*, are invited to send a postcard to Headquarters to arrive not later than October 1.

The TT21 Transmitter

C.W., N.B.F.M. and A.M. on 14, 21 and 28 Mc/s

By G. R. JESSOP, A.M.Brit.I.R.E., Assoc.I.E.E. (G6JP)*

IN designing the table top or rack mounting transmitter to be described, particular attention was paid to certain features which appear to be desirable in such equipment for the modern amateur station.

During recent years considerable work has been carried out in an effort to improve oscillator stability and it is somewhat surprising to find that there is a strong body of opinion to support the old high *C* Colpitts oscillator in preference to the series tuned circuit (Clapp). The reason for this is largely due to the greater mechanical stability that can be achieved with the smaller inductance. The high *C* circuit is therefore employed in the present design.

The improved method of screen modulation called Series Gate Screen Modulation, described in *Electronics* for November 1957 and in the May and July 1959 issues of the R.S.G.B. BULLETIN, seems to cover the need for phone facilities with the added attraction of reducing the possibility of over-modulation splatter while, at the same time, offering considerable reduction in power consumption and equipment weight as well as cost. The provision of facilities for n.b.f.m. was considered desirable because the system is often helpful in avoiding TVI. It is also obvious from the number of successful DX contacts made using this form of modulation that it is considerably more effective than was thought possible a few years ago. This is particularly true when it is preceded by a speech amplifier that includes some form of clipping to raise the average modulation level. In this connection, the cathode coupled double triode clipper offers some advantage over the earlier diode clippers.

Judging from the number of stations using inputs between 50 and 80 watts a power input level of 60 to 75 watts appears adequate. The choice of valve for the p.a. is rather limited, the two most suitable probably being the 6146 or the TT21. Other possibilities are QQV06/40 and 829B operated with both systems in parallel but these types are generally more expensive than the two single types. In view of its low initial cost the TT21 was selected.

In the interests of TVI prevention it is desirable that the r.f. circuits of a transmitter be fully screened without reliance on a cabinet to enclose these circuits so that the unit can be operated either as a table top transmitter or be installed in a rack together with other equipment without any significant increase in unwanted radiation. It is also a convenience if the more complicated units, the exciter and audio amplifier, can be completely removable from the main chassis so that construction and servicing are made easier.

Bearing these points in mind, the circuit shown in Fig. 1 was decided upon.

The Exciter

The v.f.o. employs a screened r.f. pentode V1 (Z719/EF80) operating as a high *C* Colpitts electron coupled variable oscillator covering the range 3·5–3·65 Mc/s. Provision for frequency modulation of the oscillator is made by use of a silicon voltage variable diode CR1 (G.E.C. type SX761) across part of the tuned circuit, a potentiometer providing

* *Member, Technical Development Sub-Committee, 32 North View, Eastcote, Pinner, Middx.*

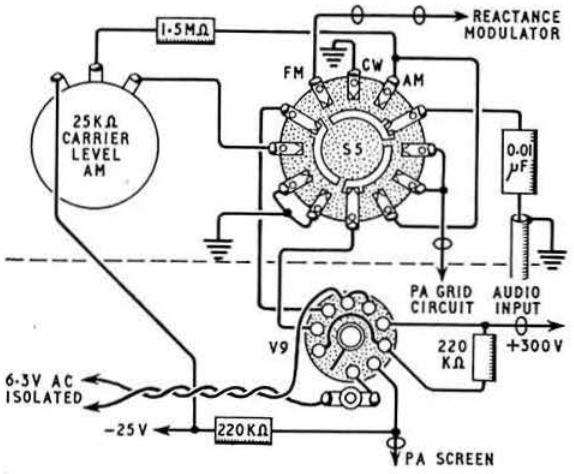


Fig. 2. Wiring of the mode (a.m., n.b.f.m., c.w.) selection switch, S5.

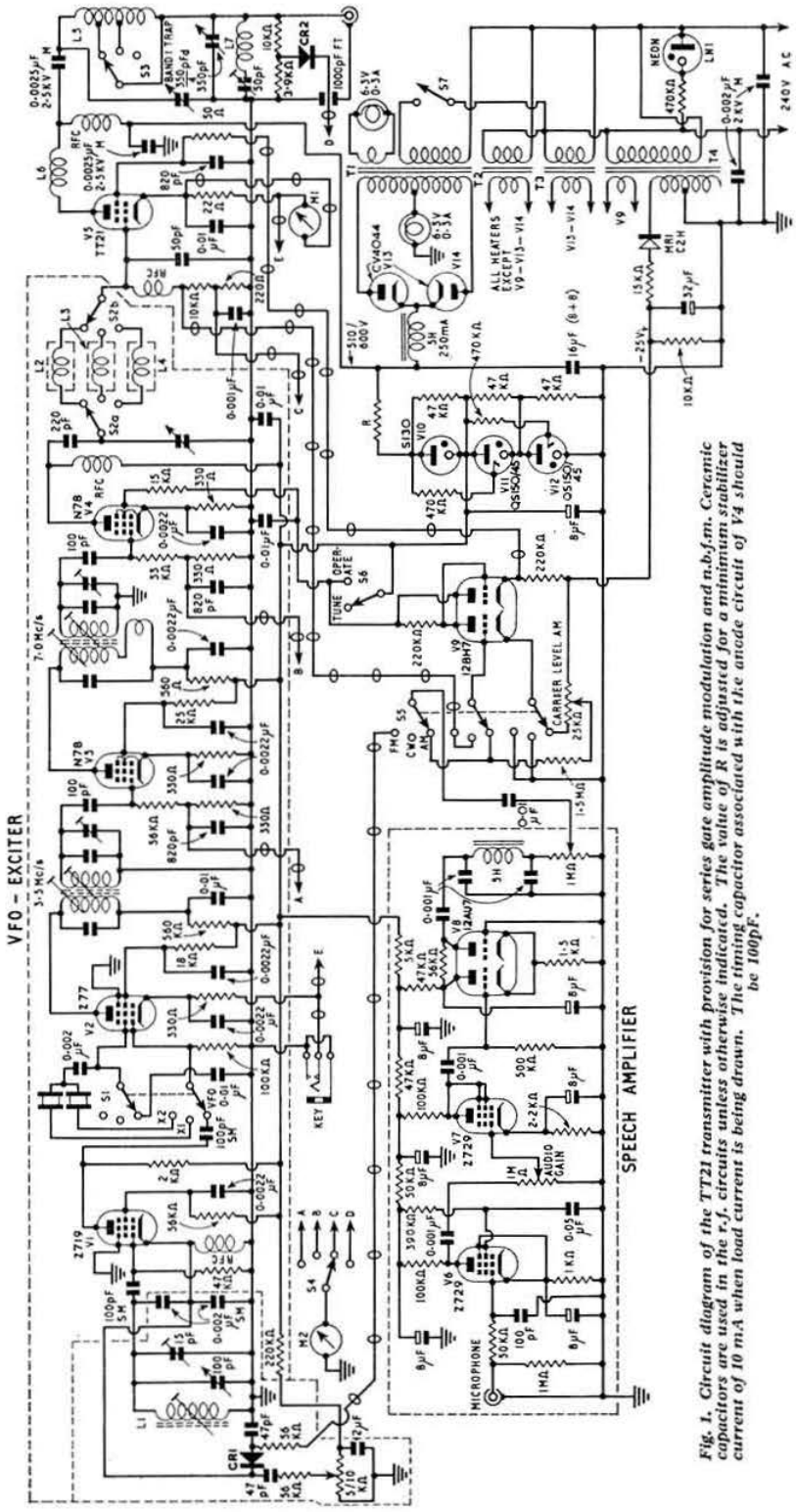


Fig. 1. Circuit diagram of the TT21 transmitter with provision for series gate amplitude modulation and n.b.f.m. Ceramic capacitors are used in the r.f. circuits unless otherwise indicated. The value of R is adjusted for a minimum stabilizer current of 10 mA when load current is being drawn. The timing capacitor associated with the anode circuit of V4 should be 100pF.

the required bias so that a suitably linear portion of the diode operating curve can be selected. In this case the bias is set to + 1·0 to + 1·25 volt which will give approximately equal capacity change for the upper and lower sideband.

The second stage, V2 (Z77), acts either as a buffer stage or as a crystal oscillator, the type of oscillator being selectable by S1. The anode circuit of this stage is tuned to 3·5 Mc/s and coupled to the next stage by a wideband coupler. V3 (N78) is operated as a straightforward frequency doubler and feeds the next stage via a 7 Mc/s wideband coupler.

The final stage of the exciter (V4) is operated as a doubler from 7 to 14 Mc/s, as a trebler from 7 to 21 Mc/s and as a quadrupler from 7 to 28 Mc/s. The valve chosen (a type N78) gives rather better performance than the more usual 5763, due to its higher slope and lower drive requirement; since it is not required to operate as an amplifier, the lack of inter-electrode screening is no disadvantage. The coupling between this stage and the p.a. is by means of a pi-network which provides harmonic attenuation while keeping the impedance of the grid circuit of the power amplifier relatively low, so helping to maintain the stability of the p.a. valve. The circuit is adjusted by tuning for maximum grid current to V5. When netting to a frequency, h.t. to the screens of this stage and of the power amplifier is switched off by S6. For c.w. operation, the cathodes of V2 and V5 are keyed.

The whole of the exciter is built as a unit so that it can be removed from the main chassis by removing four fixing screws and unsoldering the interconnections to the main chassis.

Power Amplifier

The final stage (V5) uses a type TT21 transmitting tetrode, which, in this transmitter, is operated at 60 watts peak input on a.m. and at 80 watts input on c.w. and n.b.f.m. The anode circuit is a pi-network with the inductance tapped at suitable points for three bands by S3.

Across the output are connected a Band 1 series tuned trap circuit and an r.f. voltmeter which is a useful means of correctly tuning the output circuit, the voltage being arbitrarily indicated on the meter on the right hand side of the front panel. By means of the switch S4, this meter also reads the grid current to V3, V4 and V5.

The whole of the power amplifier is built at the left hand end of the main chassis and is completely screened. The grid circuit for the valve is below the chassis and also screened.

The current input to the p.a. is indicated on M1 connected in the cathode circuit of the TT21. The valve is normally operated with 600 volts h.t. on its anode.

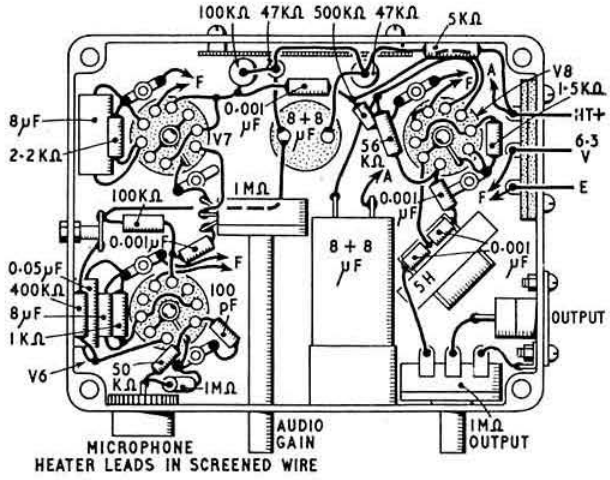


Fig. 3. Layout of the audio unit (speech amplifier and clipper).

Speech Amplifier and Modulator

The speech amplifier comprises V6 (Z729) as a microphone amplifier with a voltage gain of about 120 followed by a second stage V7 (also a Z729 but triode connected) having a voltage gain of about 25. V7 feeds the double triode clipper V8 (12AU7) in the anode circuit of which a simple low pass a.f. filter is fitted. Suitable adjustments of the two gain controls enable a considerable amount of clipping to be applied which is desirable when using n.b.f.m.

The output from this unit is switched by S5 either to the series gate screen modulator valve, V9 (12BH7), or to the reactance modulator CR1 (EW76 or SX761). When the switch is in either the c.w. or f.m. positions V9 operates as a clamp valve for the p.a. stage. The wiring of S5 is shown in Fig. 2.

The speech amplifier and clipper is built into an Eddystone 4½ in. × 3¾ in. × 2 in. die-cast box (Fig. 3) which is attached to the top of the main chassis at the front right hand corner.

An alternative series gate clamp circuit to provide for adjustable carrier level when using n.b.f.m. is shown in Fig. 4.

Power Supplies

The power supply is conventional and is provided with a 650 volt h.t. transformer and separate heater transformers.

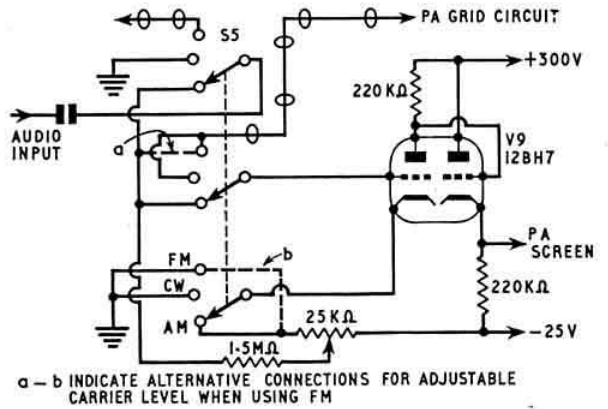


Fig. 4. Alternative series gate clamp circuit to provide for adjustable carrier level when using n.b.f.m.

TABLE I—COIL DETAILS

L1 (*v.f.o.*) 12½ turns 16 s.w.g. enam. close wound on ¾ in. diam. ceramic former with dust iron core. Tuned by 100 pF and 15 pF trimmer.

L2 (*14 Mc/s*), 20 turns 20 s.w.g. enam. close wound on ¾ in. diam. former with dust iron core (wound at top of i.f.t. former from type 373 unit).

L3 (*21 Mc/s*), 15 turns 18 s.w.g. enam. close wound on ¾ in. diam. former with dust iron core (as for L2).

L4 (*28 Mc/s*), 14 turns 16 s.w.g. close wound ¾ in. diam. (self supporting inside i.f.t. can from type 373 unit).

L5 (*p.a.*), 11 turns 14 s.w.g. enam. spaced two wire diameters 1¼ in. diam. self supporting, tapped from anode end at 8 turns for 21 Mc/s and at 4 turns for 28 Mc/s.

L6 (*parasitic suppressor*), 4 turns 16 s.w.g. enam. spaced one wire diameter, ⅛ in. inside diam. self supporting.

L7 (*Band I trap*), 7 turns 18 s.w.g. spaced one wire diameter ¼ in. inside diam. self supporting and tuned by 50 pF.

Wideband Couplers

3.5 Mc/s—primary and secondary both 45 turns 30 s.w.g. enam. close wound on ¼ in. diam. former (i.f.t. former from type 373 unit), both tuned by 100 pF, dust iron core in primary and brass core in secondary, coupling 10 pF.

7 Mc/s—primary and secondary both 34 turns 26 s.w.g. enam. close wound on ½ in. diam. former (i.f.t. former from type 373 unit), primary tuned by 22 pF, secondary tuned by 30 pF, dust iron core in primary, brass core in secondary, coupling 3 turns extra on primary wound over earthy end of secondary (see text).

The main rectifiers, V13 and V14, are indirectly heated type CV4044 half-wave valves, the pair providing the total current of about 225 mA. Smoothing of the supply is by a single 5 Henry choke and a 16 μF paper capacitor (two 8 μF units in parallel). The p.a. is fed directly but all other stages receive h.t. from the main potentiometer made up of a fixed resistance in series with three gas stabilizers V10 (S130) and V11 and V12 (both type QS150/45). The striking electrodes are connected to suitable points to provide quick ignition.

To avoid breakdown between the heater and cathode of V9, a separate transformer is used. The heater must not be earthed. A small bias supply using a 0–125 volt transformer (T4) is provided for the series gate modulator.

Construction

The complete transmitter is built on a 17 in. × 13 in. × 3 in. chassis to which a standard 19 in. × 8¾ in. front panel is rigidly fixed by panel brackets. The layout is shown in Figs. 5 and 6.

The original chassis was cut down to 13 in. wide which makes fitting of some of the front panel controls rather easier but it was necessary to add small angle brackets near the lower edge to prevent any flexing of the front panel when lifting the unit by the handles fixed to the front panel. The lower fixing screws (of the handles) also bolt the small angle brackets (1 in. long and made of ½ in. × ½ in. angle brass ⅛ in. thick) to the front panel.

After the holes for fixing the chasis to the front panel have been drilled the hole for the v.f.o.-exciter unit should be made. This is probably most readily done with a tension file.

The mounting of the p.a. screening box and the principal components on the main chassis (Fig. 6) is quite straightforward and should not present any difficulty although some care is necessary in placing the fixing holes for the p.a. so that they are not fouled by operating shafts.

The v.f.o. and exciter unit is built on to a 10 in. × 5¼ in. plate (the writer used ⅛ in. thick aluminium but ⅛ in. steel or brass would be suitable and ⅛ in. thick aluminium would be rigid enough if the long sides were stiffened by bending up along the edges). A screening box is fitted on the underside of this plate whilst the v.f.o. tuned circuit is built into an Eddystone die-cast box measuring 4½ in. × 3¾ in. × 2 in.

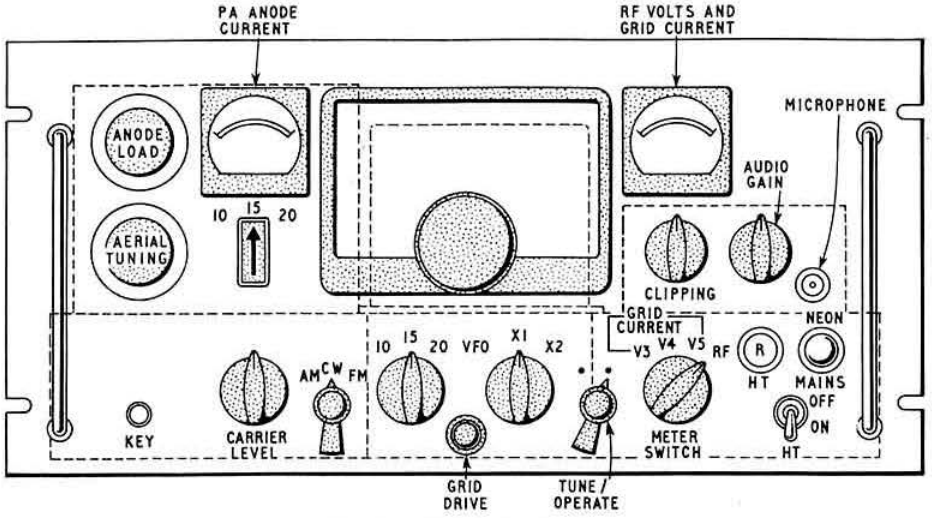


Fig. 5. Layout of the front panel.

and attached to the top near the front end by its long side with the removable plate at the rear.

The speech amplifier/clipper is built into a similar die-cast box and mounted upside down so that the valves and other components are on the bottom of the box which is attached to the main chassis by its normal four fixing screws. The lid is not used. Considerable care is necessary to position the microphone socket (a Belling and Lee Type L722/S) so that it is (i) as close as possible to the corner of the box but with sufficient clearance for attachment of the back nut, (ii) does not foul the handle on the front panel.

Both of these units are electrically connected to the rest of the transmitter by soldered connections on the distribution terminal strip in the main chassis and are readily removable for servicing and testing.

Details of the coils are given in Table 1.

The primary and secondary windings of the 3·5 and 7 Mc/s wideband couplers are wound in the same sense, the outer ends of the coils being connected to anode (top) and grid (bottom) with the earthy ends of the two coils at the centre. Coupling between the two windings is as follows:

3·5 Mc/s Top coupled through a 10 pF capacitor.

7 Mc/s Extra turns of the primary are wound over the earthy end of the secondary winding. This method was found to give more output than top capacitor coupling.

So that both the anode and grid circuits of these units can be adjusted from the top of the chassis a small trimmer is connected across each of the secondaries in addition to the core. The anode coil has a dust iron slug.

The driver anode coils are based on the same former as

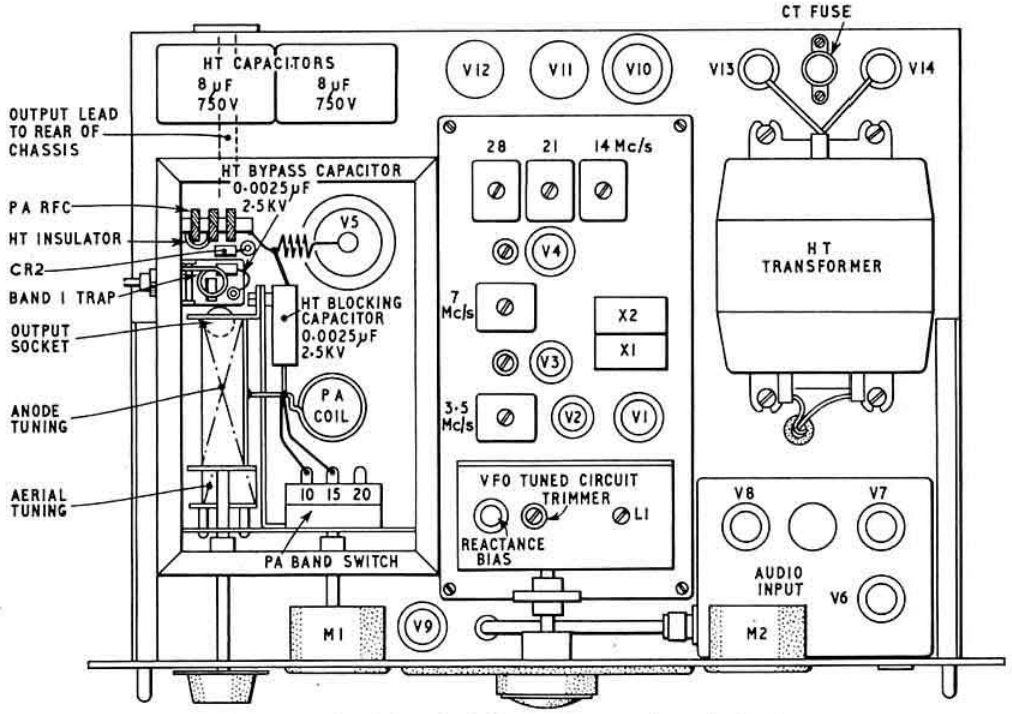


Fig. 6. Location of the principal components on the main chassis.

those used for the transformer couplings. The 14 and 21 Mc/s coils are wound on the top half of the former. The inside diameter of the 28 Mc/s coil is about $\frac{7}{16}$ in. All the coils and couplers are individually screened by their original cans.

Adjustment and Operation

After completion of the constructional work, the two smaller units should be adjusted before being fixed on to the main chassis. It is desirable that an alternative power supply giving about 300 volts at 60 mA and heater voltage should be employed while adjusting the v.f.o. exciter unit rather than the much more dangerous 650 volt h.t. source.

First, the v.f.o. should be set up and its tuning range adjusted, preferably with the help of the station receiver switched to the 10m band. With the components specified the v.f.o. covers only 1·2 Mc/s (28–29·2 Mc/s) of this band as it was felt that the more open tuning for 15m and 20m was worth the sacrifice on the higher frequency band. If preferred a larger tuning capacitor could be used so that the whole band is covered but this might result in some loss of drive at the band edges.

The stability of the v.f.o. is reasonably good. Provided, however, that the main tuning capacitor and the fixed capacitors are of good quality it should be satisfactory. Having adjusted the v.f.o. range, S1 should be set to select one of the crystals and the operation of the crystal oscillator checked. Next, with V3 in position and using its grid current at point *A* on Fig. 1 as an indication on M2, adjust the tuning of the primary and secondary of the 3·5 Mc/s bandpass coupler until a satisfactory frequency response is obtained.

The procedure should be repeated with V4 in position, using the grid current indicated at point *B*. Check that there is no instability in these stages before proceeding to adjust the anode circuits of V4.

The total anode and screen input to the first three stages should be between 40 and 55 mA at 300 volts.

If, as recommended, this preliminary tuning is carried out with an external power supply, some temporary r.f. voltmeter will be required to check the output from V4. The writer used a similar set-up to that shown in the circuit diagram for checking the p.a. output tuning—a simple potential divider and an r.f. diode such as the GEX34 placed across the output capacitor will serve.

When adjustment of the exciter stages is complete, the unit may be connected to the main power supply and the complete transmitter tested. The grid currents in each stage which may be expected are shown in Fig. 7.

The p.a. anode circuit is adjusted in the usual manner for a pi-network: tune for maximum dip as indicated on M1 and then increase the loading until V5 is drawing 120mA. Final adjustment should be made by adjusting the p.a. tuning controls for maximum output as indicated on M2 when switched to position *D*.

Satisfactory speech quality and modulation depth or deviation is obtained with the settings of the audio controls shown in Table 2.

TABLE 2

Mode	*Audio Gain Control*	*Clipper Control*	*Reactance Diode Bias*	*P.a. Anode Current*
A.m. (Series Gate)	Half to maximum	Maximum	—	40–50 mA (no sig.) 110–120 mA (max. sig.)
N.b.f.m.*	Half to maximum	Quarter to half	+1 to +1·25V	110–120 mA
C.w.	—	—	—	150–160 mA

* In G6JP's transmitter the wiring of S5 permits the carrier level to be adjusted on both series gate a.m. and on n.b.f.m.

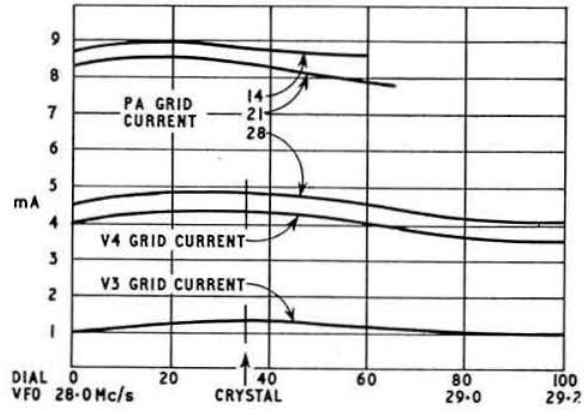


Fig. 7. Grid currents to V3, V4 and V5 with the driver and p.a. stages tuned to resonance.

When the n.b.f.m. signal is being received on a standard a.m. receiver (the most frequently met conditions) only one sideband is used.

Performance

In the limited time that the writer has been able to operate the transmitter results have been very encouraging and some indications of its performance may be gathered from the following results on 28 Mc/s:

Using a two element director beam a half-wave above ground, with its direction fixed to fire south-east reports from ZB1, MP4, VQ4, ZE2, ZS1 and ZS2, have been between S6–S9+. A few odd contacts off the back with VE8 at S6 or so are regarded as satisfactory.

The speech quality of the a.m. is reported as very good and of adequate depth. Most reports on the n.b.f.m. signal have also been good but as mentioned earlier practically all the stations contacted were using a.m. receivers.

Assuming a good aerial which is rotatable it is believed that this transmitter will give a good account of itself for those operators who do not insist on using the full 150 watts permitted by the Amateur (Sound) Licence.

Index to Volume 36

THE Index to Volume 36 (July 1960 to June 1961) is enclosed in this issue of the BULLETIN.

Carry your Mobile Licence !

FROM time to time, amateurs operating mobile are asked about their activities and members are advised therefore to carry their Amateur (Sound Mobile) licences with them whenever out with their equipment.

REGION 14 OFFICIAL REGIONAL MEETING

MONTGOMERIE CASTLE HOTEL, near AYR

September 10, 1961

Tickets, price 22s. 6d., may be obtained from D. Tannock (GM2BUD), 47 Sunnyside Crescent, Mauchline, Ayrshire

Full details will be published in the August issue of the Bulletin

An R.F. Capacity Bridge

By I. D. MACARTHUR (G3NUQ)*

MANY published designs for bridges are of the *R/C* type but these can seldom measure capacities of less than 100 pF with any accuracy. The need was felt for a cheap bridge capable of measuring accurately capacities as small as 1 pF but it will be apparent that the usual 50 c/s bridge is of no use for measuring these small values, since 1 pF represents a reactance of about 3000 Megohms at this frequency.

An r.f. bridge is the obvious answer. The frequency should be high enough to make the bridge reasonably sensitive and

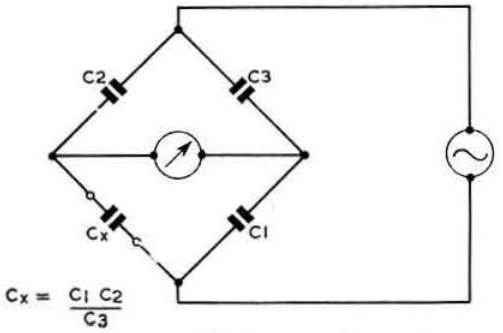


Fig. 1. Wheatstone bridge for measuring capacitance.

yet not so high as to introduce unwanted coupling between components. The optimum frequency is between about 500 kc/s and 3 Mc/s. In the writer's bridge it is about 1·5 Mc/s, but this is not at all critical, and was chosen because a suitable oscillator coil was available.

Since the bridge was designed only to measure capacity, it was decided not to include any facility for measuring phase angle. This is always close to zero for good small value

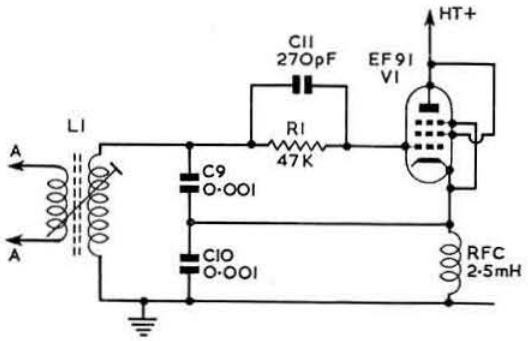


Fig. 2. The Colpitts circuit used for the r.f. oscillator.

capacitors of the types by amateurs and leaky ones are more easily detected by other means anyway.

Any bridge measuring system consists of three parts: (i) the bridge, (ii) the source and (iii) the detector. These will be dealt with separately.

* *155 Woodford Road, Bramhall, Cheshire.*

The simplest of all bridge circuits is the Wheatstone bridge. Although probably more familiar as a circuit for measuring resistance, it is equally suitable for use as a capacity bridge (see Fig. 1). It can easily be shown that

$$C_X = \frac{C1C2}{C3}$$

If C1 is made variable, it will be possible to measure a range of capacities at C_X and this range can be increased by making C2 or C3 variable in steps. With the bridge described here the overall range is 0 to 1500 pF. This range was obtained by making C1 a 75 pF variable, C3 100 pF and C2 switched in steps of 47 pF, 270 pF, 1000 pF and 2000 pF. For capacities above about 1500 pF the sensitivity is poor, but fortunately the amateur is seldom interested in knowing accurately the value of capacitors above this figure.

To eliminate "hand capacity" effects it is essential that one side of C1 be earthed, and to simplify the detector it is also desirable that one side of this should be earthed. This necessitates a source which is isolated from ground and is achieved by employing a transformer. The writer used a medium wave oscillator coil, the feedback winding providing the output to the bridge. The oscillator, see Fig. 2, is a Colpitts since this enables a simple coil to be used. It should be noted that the components need not be of a high order of stability since the bridge is not frequency dependent. Any small triode or pentode may be used as the oscillator valve.

The detector (Fig. 3) is an EM81 tuning indicator fed by a diode rectifier. It was found that the bridge was easiest to balance with the "eye" open rather than shut and the diode is connected to achieve this. It should be noted that the EM81 indicator has an amplifier built into it which inverts the signal before applying it to the control electrode. Some indicators do not have this amplifier and if one of these is used, it will be necessary to reverse the diode.

The power supply should provide 200-250 volts at about 15 mA. Regulation and smoothing are not important and a single 16 μF capacitor is quite adequate. A small converter transformer is used to isolate the unit from the mains.

The circuit of the complete instrument is shown in Fig. 4. The bridge was built inside a standard chassis 8 in. × 6 in. × 2½ in., but could have been made much smaller.

Calibration

The calibration of the bridge is quite easy, all that is needed being a few accurate capacitors and a little patience.

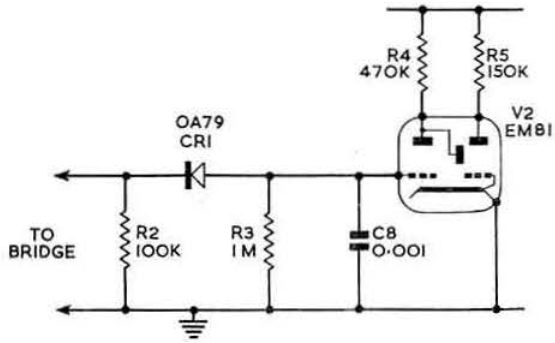


Fig. 3. The detector and indicator.

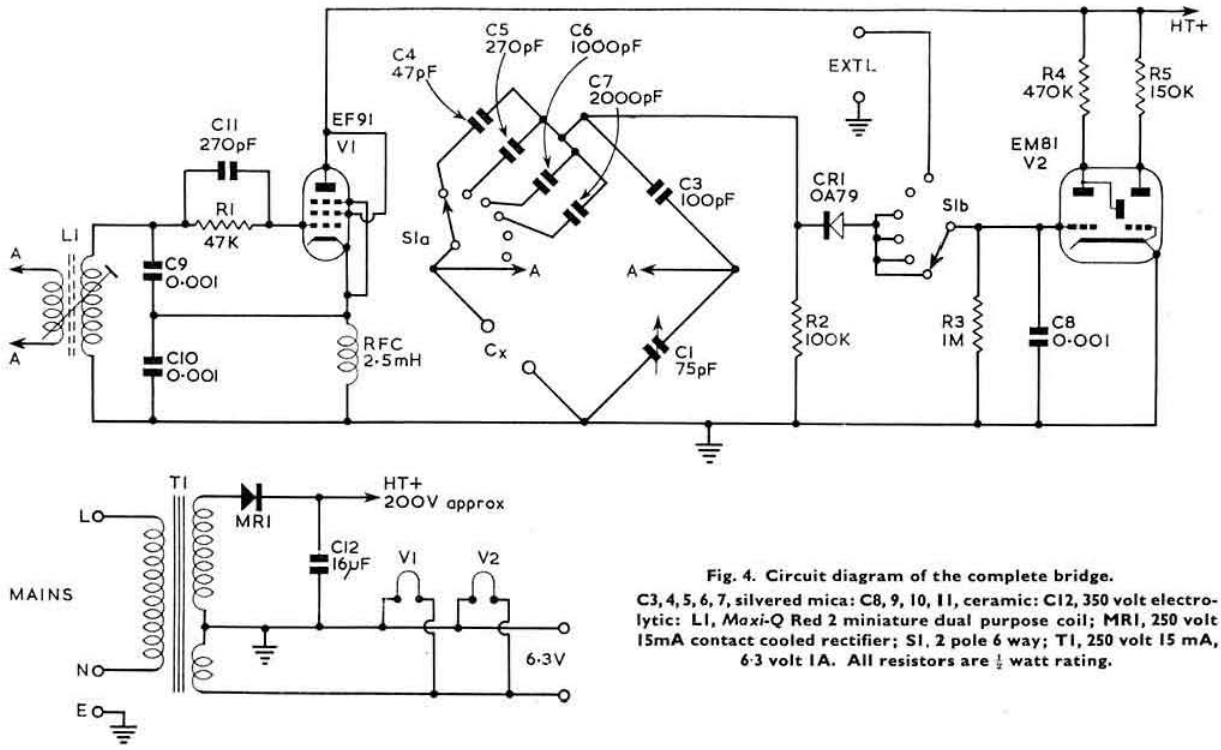
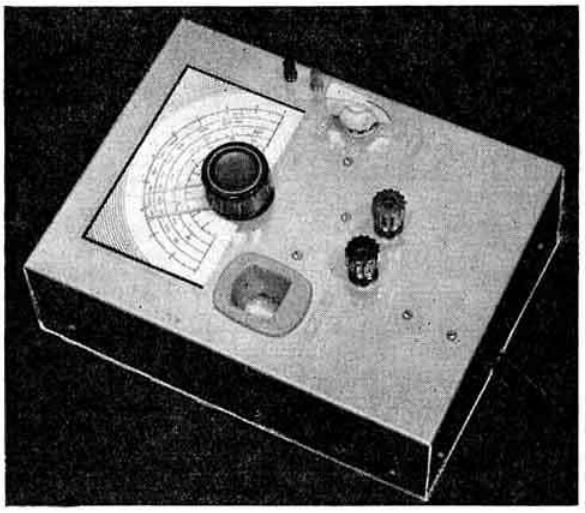


Fig. 4. Circuit diagram of the complete bridge.
C3, 4, 5, 6, 7, silvered mica: C8, 9, 10, 11, ceramic: C12, 350 volt electrolytic: L1, *Maxi-Q* Red 2 miniature dual purpose coil; MR1, 250 volt 15mA contact cooled rectifier; S1, 2 pole 6 way; T1, 250 volt 15 mA, 6·3 volt 1A. All resistors are ½ watt rating.

The following capacitors are needed and they should be good quality silver mica with a tolerance of ±1 per cent ±1 pF: 5, 10, 25, 50, 100, 250, 500, 1000 pF. (Suitable types are made by Radiospares Ltd.) With these standards it is possible to calibrate the bridge throughout its range.

Proceed as follows. Start on the lowest range and with no capacitor connected across the terminals, adjust C1 for balance. This point should be marked zero. (This is to balance out the stray capacity. If it is not possible to obtain a balance—the eye must be fully open—solder a small capacitor, about 5 pF, across the terminals until a balance can be obtained.) Next connect the 5 pF standard to the test terminals using the shortest possible leads and adjust C1 for balance, mark the scale 5. Repeat the process using the 10 pF standard. Next solder the two together and repeat, marking the scale 15.



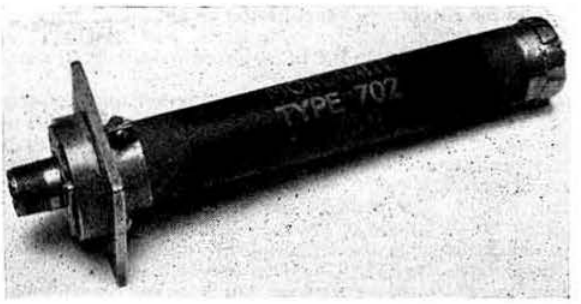
A view of the complete r.f. capacity bridge.

This process should be carried on over the complete range of the instrument, changing ranges where necessary. Each range should overlap the previous one to give complete coverage with no gaps. If it is found that there are gaps, C4, C5, C6 or C7 should be altered to give unbroken coverage from zero to 1500 pF.

If a straight line capacity type capacitor is used for C1 it will be found that the calibration is linear and any points which have been missed, such as 20 or 200, can easily be interpolated into the scale.

All the components of the bridge should be mounted as rigidly as possible, and once the bridge has been calibrated they should not be moved. The switch S1 was used because it was available and in fact a 1 pole 4-way switch would have been adequate. The specified 2 pole 6-way switch, however, allows the indicator to be used from an external source and to be switched to zero input during standby periods and for comparison. This has been found very useful. It is a help if C1 is fitted with a slow motion drive since the null is quite sharp. All the wiring should be run in straight lines to keep stray capacity to a minimum.

It is likely that the reader will find most of the parts for this instrument already in his junk box. If all the parts have to be purchased the cost should be about £3. The instrument has amply repaid the time and money spent on it and is frequently used.



A 25 Watt Dummy Load for V.H.F. Use

By G. C. FOX, A.M.I.E.E. (G3AEX)*

THE simple form of dummy load to be described has been found useful in carrying out non-radiating tests with low power 144 Mc/s transmitters, and also for the setting up of reflectometers, where a termination having a negligible reactive component is essential. The method of construction is applicable to higher power loads by the incorporation of a load resistor of suitable rating.

The physical form of the dummy load is that of a hollow tube with an inner rod down the centre; thus it resembles a short length of coaxial line, and its characteristic impedance is determined by the radii of the inner and outer conductors in a similar manner. One end of the line is closed with a disc of copper, the other is fitted with a suitable coaxial connector. The power applied to the load is dissipated as heat in the outer conductor of the line, and is radiated to the surrounding air more readily than if the inner conductor were the dissipative element. This is important because the resistive component of the load is dependent upon its temperature, decreasing as the temperature is raised. Where it is essential to have a known accurate termination it is desirable therefore that the input to the load should not be sufficient to raise its temperature appreciably.

The dimensions of the coaxial line are determined by those of the Morganite type 702 tubular carbon resistor which forms the outer conductor. The resistor used had an overall length of 150mm with inner and outer diameters of 15mm and 25mm respectively. The outer cylindrical surface is plated for a distance of 1 in. from each end to assist in making electrical contacts to the resistor. The diameter of the inner conductor is calculated from the formula $Z_0 = 138 \log_{10} D/d$ (where D = inner diameter of outer conductor, and d = overall diameter of inner conductor) and in this instance was found to be 4·67mm (approximately $\frac{3}{16}$ in.) for a 70 ohm load. The length of the inner conductor is made sufficient for it to project through a suitably sized hole in the centre of the short circuiting disc when assembled, so that it can be soldered up as the final assembly operation.

Connection to the outer conductor is made by means of a 1 in. diameter capacitor clip which in turn is screwed to a 2 in. square by $\frac{1}{8}$ in. thick brass plate referred to as the mounting plate. On the other side of the mounting plate is the Amphenol socket used to make the external circuit connections. The inner of the Amphenol connector is soldered to one end of the inner conductor of the line, which is first drilled and slotted for a distance of $\frac{1}{4}$ in. to facilitate this operation. It was found necessary to interpose a spacing plate between the mounting flange of the Amphenol socket and the mounting plate to ensure that the end of the tubular resistor seated squarely without fouling the back of the socket. This may not be necessary with Amphenol sockets of American manufacture.

The short circuiting disc is soldered to the free end of the resistor using the mounting ears which are bent over so that they lie over the cylindrical plated area of the resistor. A very hot iron is required for this operation to ensure that the solder flows freely. It is not desirable to go over it more than once because the plating on the carbon will tend to lift off.

Exact details of the various components have not been given as the individual constructor may wish to vary the design somewhat to suit his own requirements. The fundamental necessity is to avoid discontinuities in the coaxial assembly as far as possible as such discontinuities will produce errors in the effective load impedance. Measurements on the load over the frequency range 144-146 Mc/s show the admittance of the load to be 0·97 + 0·02 (normalized to 70 ohms.) which corresponds to a reflection coefficient of 2 per cent. The small reactive component could be removed by elaboration of the design but for the purposes for which the load is required, this was not considered necessary. An illustration of the finished load is shown in the photograph.

Acknowledgement is made to R. C. Hills (G3HRH) who kindly carried out the performance measurements.

* *Member, Technical Development Sub-Committee, 66 Homemead Road Bickley, Kent.*

Television and Broadcast Interference

MEMBERS with television or broadcast interference problems are invited to write to Headquarters for a copy of the TVI/BCI Committee's interference questionnaire. This form is designed to give the Committee a comprehensive picture on which to base their advice to a member.

Build-It-Yourself Leaflets

THE following leaflets and pamphlets, originally produced for sale on the Society's stands at exhibitions, are available from Headquarters. Apart from the BULLETIN reprints, the text is in typescript. The prices quoted include postage.

" All Band Grid Dip Oscillator "*	1/3d.
†" Curing TVI with Co-axial Stubs "*	9d.
†" Diagnosis of TVI "*	1/-
" Morse Sender " (audio)	6d.
" One Valve Two Stage Pick-up Amplifier "	6d.
" Simple 160m Transmitter for the Beginner using Miniature Valves "	1/3d.
" Progressive Three Receiver "	9d.
" Radio Amateur Applications of the Transistor "	2/6d.
" Revision Sheets for Candidates taking the R.A.E."	1/-
" R.S.G.B. Two Metre Converter "*	1/3d.
" Simple Transistor Amplifier "	6d.
" Simple T.R.F. Receiver using Miniature Valves "	9d.
" Single Sideband Exciter "	2/6d.
" The Beginner's Amateur Bandspread Receiver "	9d.
" Three-in-One Receiver "	9d.
" Transistor Code Practice Audio Oscillator "	9d.
" Transistor Crystal Marker Oscillator "	9d.
" Transistor Tester (*P-N-P*) "	9d.
†" TVI *Can* be Cured "*	1/-

* BULLETIN reprint.
† The set of four TVI reprints may be purchased for 2/6 post paid.

The Heathkit SB-10

REVIEWED BY R. F. STEVENS (G2BVN)*

THE Heathkit SB-10 Adaptor was designed specifically for use with the American "Apache" transmitter to enable that equipment to be used for single sideband suppressed carrier emission on all bands from 3·5 to 28 Mc/s. An adaptor differs from an exciter in that it contains no carrier generator, but the use of the SB-10 is not confined to operation with the "Apache," and it can be readily employed with r.f. driver and power amplifier units which may be available in existing a.m. equipment. Alternatively these units may be constructed and used in conjunction with the SB-10, the whole forming a relatively inexpensive s.s.b. transmitter.

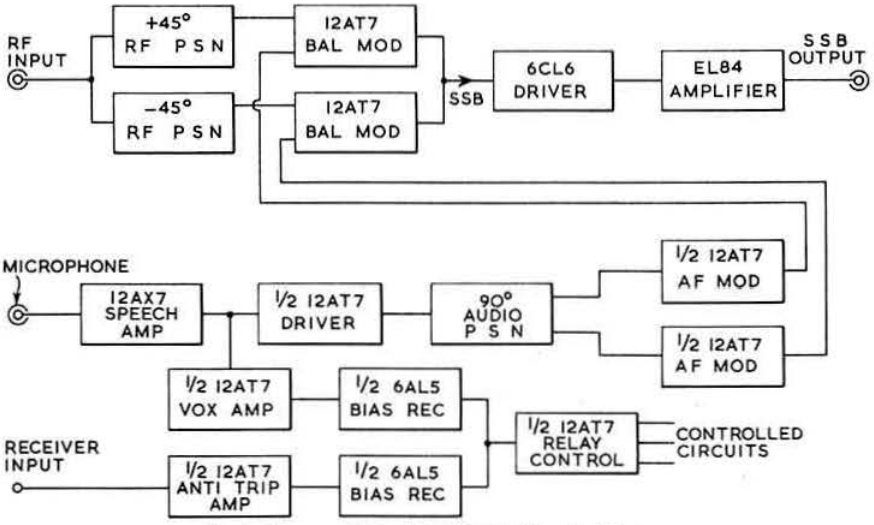
The Adaptor, which measures 10 in. high by 7 in. wide and 13 in. deep, contains the following circuits: (*a*) r.f. balanced modulators (two 12AT7), r.f. driver (6CL6) and linear r.f. amplifier (EL84); (*b*) speech amplifier (12AX7), audio driver (half 12AT7) and a.f. modulator (12AT7); (*c*) voice control voltage amplifier (half 12AT7), anti-trip amplifier (half 12AT7), bias rectifier (6AL5) and relay control valve (half 12AT7).

The r.f. input to the Adaptor should be at low impedance and less than 3 watts of power at the working frequency is required. The input passes through a broadband r.f. phase shift network of the passive type which has five switched positions for the bands 3·5 to 28 Mc/s. The r.f. signal is divided into two components which are each at 45° to the input, i.e. 90° to each other, and which drive in parallel the grids of the two balanced modulators. The anodes of the 12AT7s are connected in parallel push-pull and the output signal, in this case the carrier, is balanced out. The cathodes of the balanced modulators are returned to earth through two potentiometers mounted on the front panel which comprise the carrier null controls.

The speech amplifier is designed for high impedance input and after amplification by two resistance-capacity coupled stages the a.f. signal passes to a *R*/*C* network which divides the signal into two components separated from each other by 90° over the range 300 to 3,000 c/s. The phase shift network used in the unit under review was the Barker and Williamson type 2Q4. The two a.f. signals drive the grids of a 12AT7, the anodes of which are in push-pull. A pre-set potentiometer functioning as the audio balance control is located in the cathode circuit of this valve and is used to ensure that the output to each of the transformers in the anode circuit is equal. These transformers provide a.f. voltages of the required phase difference which are applied to the grids of the two 12AT7s forming the balanced modulators. A switch in this grid circuit enables upper, lower or double sideband operation to be selected by applying the a.f. voltage in the correct phase relationship.

The s.s.b. signal from the balanced modulators is amplified by a 6CL6 class A driver with a broadband output circuit, and capacity coupled to the grid of the EL84 class A amplifier which furnishes low impedance output through an all-band pi-network circuit. A small capacity is used to couple in a little of the output to a r.f. voltmeter circuit (panel mounted meter) which is used for adjustment and tuning. The maximum output from the EL84 is approximately 10 watts p.e.p.

The SB-10 contains its own voice control and anti-trip circuitry and the output of the speech amplifier is applied to the grid of the VOX voltage amplifier. Similarly, output from the receiver is applied to the anti-trip amplifier, and the output from this is coupled to the cathode of a bias rectifier (half 6AL5). The plate of the VOX voltage amplifier is applied to the anode of the second half of the 6AL5, the cathode of which is directly coupled to the grid of the relay control valve (half 12AT7). The relay will be operated by sounds reaching the microphone, but when the anti-trip bias is correctly set, audio from the receiver will not cause the relay to trip. The relay contact terminations are brought out to an insulated strip on the rear apron and allow r.f. driver keying, receiver loudspeaker muting and aerial relay operation.



Block diagram of the Heathkit SB-10 s.s.b. Adaptor.

The front panel controls of the Adaptor comprise: two carrier null potentiometers, a five-position bandswitch, sideband selector switch, balanced modulator tuning, r.f. amplifier tuning, audio gain, standby-VOX-manual switch and microphone socket. The rear apron carries the power input socket, relay terminal strip, sensitivity controls for the VOX and anti-trip circuits, and r.f. input and output sockets. There are also two pre-set potentiometers on the chassis of the unit for audio balance and phase balance.

The power requirements are 6·3 volt a.c. at 3·5 amp., and 85 mA (average) at 350 volt d.c., the h.t. current swinging up to a maximum of 140 mA on speech peaks. The figure of 350 volts is that given in the manufacturers' handbook, but it has been found in practice that this may be reduced to 260/270 with very little reduction in output and considerably less heat generation. The power supply used with the Adaptor should have good dynamic regulation and it is recommended that the output capacitance should be of at least 64μF.

The construction of the unit occupied 16 hours in irregular periods of one hour or so, and was carried out strictly according to the manual supplied, in which the instructions were concise and clear, although it is advisable to make at least two readings of the more complicated sections. As might be expected from a Heathkit unit, the components were of good quality and the external appearance was attractive.

Member, Technical Committee

Operation

R.f. drive for the SB-10 was obtained from a " Miniciter " made by the Minimitter Co. Ltd., the output of which was altered to low impedance to allow connection to the Adaptor by coaxial cable. The linear power amplifier employed two TT21 valves in parallel and was described in the R.S.G.B. BULLETIN for June 1960. There is, however, no reason why other equipment capable of supplying the necessary r.f. drive should not be used, bearing in mind that it is essential that the stability of the v.f.o. must be of a high order. It is not a difficult process to modify an existing a.m. class C p.a. for class A or AB1 operation, and details will be found in the sideband handbooks by W6TNS or the A.R.R.L.

The initial testing and adjustment was carried out according to the instructions in the manual, but the suppression of the unwanted sideband was considered insufficient, although possibly this may be partly accounted for by the deficiencies in the oscilloscope used. Subsequently, the audio and phase balance controls were adjusted using a valve voltmeter and oscilloscope in the manner described in the fault tracing section of the manual. The settings thus obtained were checked by inspection on a panadaptor using a very narrow sweep. It has been found that alignment of fundamental frequency phasing-type generators, such as the SB-10, using a s.s.b. receiver is often unsatisfactory owing to radiation from the r.f. driver on the carrier frequency. After completion of the initial adjustment the carrier suppression was found to be slightly less than 50db and the suppression of the unwanted sideband approximately 35db.

The output from the Adaptor is amply sufficient to orive the linear amplifier to full output, and when using a D104 crystal microphone it is not necessary to advance the audio gain control more than the first 90° of its travel. It cannot be emphasized too strongly that it is essential to place quality before quantity, and if the SB-10 is overdriven, either by excessive r.f. excitation or too high audio input, then the output will be severely impaired which may result in interference to stations on adjoining frequencies.

To produce a clean and acceptable s.s.b. signal it is necessary to assemble carefully this piece of complex equipment and to thoroughly check the results of the alignment. For the perfectionist there are modifications which can be done to improve the performance, and these may form the basis of a future article, but there is no reason why the SB-10 should not be the means of generating a s.s.b. signal that is acceptable in quality with the additional advantage that the cost can be kept to a minimum by the utilisation of existing equipment.

The SB-10 Adaptor is made in U.S.A. and is obtainable from Daystrom Ltd., Gloucester.

Notes on the Use of the CV138 in Exciters and Low Power Transmitters

THE well-known television r.f. pentode amplifier type CV138 (EF91, 6AM6, 8D3, Z77) does not appear to be used to an extent justified by its performance. Indeed, many descriptions of amateur equipment specify larger and more expensive valves in positions which could equally well be filled by this valve with its high slope and gain. In such applications as crystal oscillators, crystal oscillator-frequency multipliers, low power amplifiers and frequency doublers or treblers the CV138 will be found to give sufficient output for most applications.

The purpose of the data given here is to indicate how well the valve will perform under correct conditions. From Fig. 1 and Table 1 it will be seen that as an r.f. amplifier, outputs of over 1·2 watts can be obtained up to 150 Mc/s, so the valve could usefully be employed in low power 2m equipment. A pair in push-pull give 2·25 to 2·5 watts output for 6 watts input. As a frequency multiplier an output of about 0·8 watt can be obtained at frequencies of the order of 150 Mc/s when operating as a doubler; as a trebler the same power can be produced at up to 100 Mc/s.

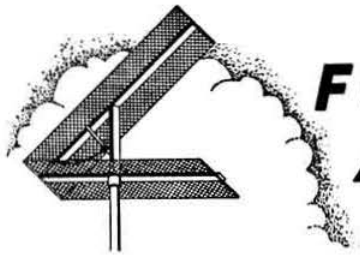
TABLE 1

Service	F_{in}	F_{out}	I_a	I_{g2}	I_{g1}	P_{out}
Amplifier	60	60	11·5	3·2	1·5	1·9w
	120	120	11·5	3·2	1·7	1·6w
	200	200	9·7	3·2	1·9	0·4w
Frequency doubler	30	60	10·0	3·2	1·5	1·5w
	65	130	10·0	3·2	1·6	1·1w
	90	180	9·0	3·2	1·8	0·25w
Frequency trebler	20	60	10·5	3·2	1·6	1·1w
	30	90	10·0	3·2	1·7	0·9w
	50	150	9·0	3·2	1·8	0·2w
Operating Conditions: V_a, 300 volts, V_{g2}, 250 volts, V_{g1}, 20 volts						

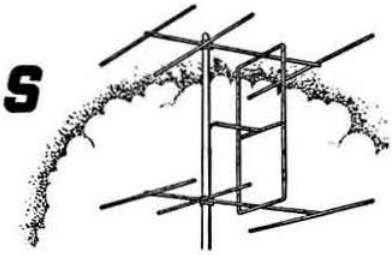
It should be noted that the screen input is the limiting factor of input power and should not be exceeded.

It is clear that the CV138 can be employed in the early stages of most amateur equipment used both on the h.f. bands and for 2m and 70cm. Similar results may be obtained using the fully screened versions commercially known as the EF80, Z719, 6BX6 and 6BW7. In these cases the valve is fitted with B9A base and a larger bulb.

Some of those present at the Grafton Radio Society's Annual Constructors' Competition for the G3KGC Cup. Left to right, P. Solder (G5FA) and S. H. Iles (G3BWQ), judges: R. Morgan (G3KGC), donor: D. Sloan (G3ONS), winner: R. Howel (G3KRH), second and P. Beresford (G3AFC), third.



FOUR METRES AND DOWN



By F. G. LAMBETH (G2AIW)*

THERE is still much comment regarding nets, the general opinion being that they should be in their correct zones. For example, **G3HAZ** (Birmingham) says "*Please* if you must have nets on 2m, let them be in their respective Zones." There is an objection to hearing southern area nets on 145·8 Mc/s when trying to winkle out G3BW or a GI or a GM out of the other noises. As the run of the mill crystals are easily moved up (grind) or down (solder) by a few kc/s, there should be no difficulty about this.

G3HWR (London N.W.3) favours nets on 2m, enjoys net working and while he would not claim that net operation is the most efficient method of radio telephone operation there is much to be said in its favour for clubs and local groups. The burning question is what frequencies to use. Shorn of its frills, the argument for out of zone operation is "I cannot hear the DX, therefore there is no DX, therefore no one wants to work DX, therefore it doesn't matter if I operate on the DX frequency." This poses the question: "What do the DX stations think about this?" (which has already been answered—they don't like it). When stations occupy DX frequencies out of their zone any opening is liable to be masked until well under way and valuable time is lost: G3HWR therefore suggests the following frequencies for local nets:

Zone	*Frequency*	*Crystal*
1 and 2	144·240 Mc/s	6010 kc/s
3	144·480 Mc/s	6020 kc/s
4	144·600 Mc/s	6025 kc/s
5	144·960 Mc/s	6040 kc/s
5	145·080 Mc/s	8060 kc/s
6	145·260 Mc/s	8070 kc/s
7	145·440 Mc/s	8080 kc/s
8	145·620 Mc/s	8090 kc/s
9	145·80 Mc/s	8100 kc/s

If West Country stations can find a suitable source of crystals the sharing of 144·24 Mc/s could be avoided. An alternative to 145·8 Mc/s for Zone 9 would be 145·98 Mc/s from a 8110 kc/s crystal.

These frequencies could be used for any local corporate activity such as rallies, R.A.E.N. exercises, etc., and during periods of low activity (e.g. daylight hours) they could be used as calling frequencies. It is appreciated that the 6 Mc/s range of crystals is not very popular but all the common 8 Mc/s types, unfortunately, come out on aircraft channels.

G3LTF (Galleywood) declares himself in agreement with G3BLP's remarks last month. He says we have a long way to go to match that 2,500 mile record for 2m and we "won't do it by chewing up portions of the band in nets," only by some really intensive weak c.w. work and the two are quite incompatible as G3HBW mentions.

G3CCH would like to add his "twopennyworth" of comment about persistent out-of-zone operation. There appear to be many stations in the Yorkshire/Lincolnshire/Derbyshire zone (145·5/145·8 Mc/s) who operate persistently in the zone 145·6 to 146 Mc/s. Why this should be so is not understood, as Zone 8 is not overcrowded at present except on certain surplus crystal frequencies! Having stations with S9 signals on top of weak GM and GI stations is certainly very frustrating, to say the least.

More complaints about out of zone operation have been received in recent weeks. A bad case recently blotted out some Cornish DX for a long period while some of the operators in Hampshire seem to get into the Midlands zone quite often. In particular some of the "calling frequency" people do not always go back to their own zone as quickly as they should. *This won't do!* Remember, this practice may be tolerated, but it still is not right, and if you must move out of zone please consider the convenience of others.

G4LX's Auroral Report

On May 3, sunspot activity indicated that an auroral disturbance would be likely, but no great opening occurred. In Sweden SM6PU found slight auroral reflection on May 3, which grew more and more intense. He had QSOs with SM3AKW on May 4 and 5, with a beam direction of 0°. On May 6 the auroral conditions disappeared gradually. This did not develop into an important opening, nevertheless the aurora lasted throughout four days. In Scotland these conditions were noted by GM3GUI, and in England by G4LX. Nothing else of great interest took place except in Sweden where slight auroral effects were observed on May 11, 16, 25, 28 and 31 without any positive results on 144 Mc/s.

Meteor Scatter

G3CCH (Scunthorpe) and OE3SE have at last succeeded in making a QSO. This happened on June 7 at 04.00/06.00 on c.w. They ran skeds from June 2 to June 12 and heard each other on most days with pings and bursts. An attempt at another QSO using s.s.b. from G3CCH did not fully materialize, as G3CCH was unable to copy the report. It is hoped to try again, with s.s.b. both ways, in the near future. G3CCH says it *should* be possible, but needs considerable patience to wait for a couple of good bursts, plus, of course, the suitable equipment!

Two Metres

G2DHV/M (in Bucks) recently heard G3JHM/A (Sussex) on a "halo" and when a "kite borne wire" was added found an increase of 6db in the signal received, but unfortunately no QSO resulted.

G5ZT (Plymouth) worked F9JY on May 15 (phone) and on the 23rd G3KPT (West Bromwich). Nothing else was noted, however, apart from the consistent daily skeds (13.30 G.M.T.) with G3JGJ and GC2FZC, also odd QSOs with G3LTN (Andover). G5ZT feels that more QSOs could be made around 13.30 G.M.T. if stations were on and beamed that way, because G3LTN is always workable. From Haytor, Devon, he has worked 52 stations. From Bexley, Kent (during a mobile tour London–Dover–Reading)

* *R.S.G.B. V.H.F. Manager, 21 Bridge Way, Whitton, Twickenham, Middlesex.*

he worked 13, near Reading another 13, and from Comb Hill (near Newbury) another 37 including PA0HN! So it can be done.

G3LTF (Galleywood) worked PA0EZ on May 21 and on June 5 appears to have had a 2m opening all to himself, when SM6ANR (589) and OZ9EN (59+) were worked. On June 14 G5ZT/P was worked at 59+. G3LTF would welcome meteor scatter skeds for the Perseids.

G3HWR says that he and G3LAR are going to South Wales during the first two weeks in September and the tentative dates are: travelling September 4, Hereford or Brecknock September 5, and then generally westward as conditions dictate. The last day will probably be September 16. They will almost certainly visit Pembrokeshire and Cardiganshire if conditions are at all reasonable. They will be looking for weak signals as well as strong ones, in the hope of helping some of the poorer sited Home Counties stations in their quest for the rarer counties. The frequencies are not known yet, but will be in their correct zone. Fuller details will appear in the August BULLETIN.

During the evening of June 19 there was an opening to the West and South Wales, **G2AIW** working GW8UH and G5DW and hearing G6GN and GW3MFY. Signals were quite strong at times, with fading, but easily workable.

G3MTI (Malvern) was hearing G2AIW during the western opening of June 19 mentioned earlier. Having been experimenting with morning calls (30 of them) without success G3MTI is reluctantly discontinuing these, as reliable recordings are being made elsewhere. Incidentally GB3VHF was stronger and steadier at 07.00 on May 31, June 5, 6, 14 and 15 than on *any* evening during the past month. Conditions have steadily improved since about June 13. G3MTI says that G5ZT/M from Haytor, Devon, is a notable signal every Wednesday evening, but the most outstanding signal of the month was perhaps G2MF/M (near Sheffield) who was unfortunately apparently tuning too fast to hear some of the stations calling him!

G2DTO/M will be operative on 2m from July 21 at 19.00 G.M.T., *en route* from South London via Stamford, Doncaster, York, Darlington to Carter Bar, Northumberland. From then on his location in the evenings will be as follows: July 22 (Northumberland), 23 (Northumberland or GM), 24 (Cumberland), 25 (Westmorland), 26 (Westmorland), 27 (North Wales), 28 (South Wales), 29 (South Wales), 30 (/M to South London). Frequencies in use when mobile will be 144·2 Mc/s and when portable according to Zone.

F3SK, writing from Bilbao, says his friends there are working seriously at v.h.f. equipment. Having visited them with some " Proopsies " in his pockets, and looking around to find some good portable locations F3SK hopes that we shall soon register the first G/EA contact, possibly with one of the following: EA2DQ, EA2EJ, EA2DS, EA2DJ, and EA2EM.

GM2FHH (Aberdeen) ran a " sideshow " on 2m during N.F.D. using the home QTH receiver and converter, and running 75 watts c.w. to a QQV06/40 into a 4-over-4 slot beam aerial 15 ft. high and checked the band for a period of approximately 20 hours, thus satisfying himself that conditions *do* improve at dawn ±2 hours. During this time GM3HLH/P, GM3KYI/P, GM3FSD, GM3GUI, G3CCH and G5YV were worked. G5YV was worked three times, and copied (mostly 599) off the back of his beam during his auto sked with HB9QQ (06.30 G.M.T.), a real eye opener for a good QTH! GM2FHH will be operating portable during most fine weekends this summer.

R.S.G.B. V.H.F. BEACON STATION GB3VHF

The frequency of the Society's v.h.f. beacon transmitter at Wrotham Hill, Kent, when measured by the B.B.C. Frequency Checking Station, was as follows (nominal frequency 144.50 Mc/s):

Date	Time	Error
June 6, 1961	13.39 G.M.T.	710 c/s low
June 13, 1961	12.15 G.M.T.	144 c/s low
June 20, 1961	13.45 G.M.T.	850 c/s low
June 27, 1961	19.50 G.M.T.	750 c/s

The station is in operation from 06.30-23.59 B.S.T. daily but may be on for the full 24 hours for test purposes from time to time.

LONDON U.H.F. GROUP
will meet at the Whitehall Hotel, Bloomsbury Square, London, W.C.1.
at 7.30 p.m. on Thursday, August 3, 1961
All v.h.f. and u.h.f. enthusiasts welcome.

Seventy Centimetres

G5QA (near Exeter) has been almost exclusively on 70cm and has now worked four counties—Devon (G3GWH), Monmouth (GW3ATM), Gloucester (G6GN) and Cambridge (G2XV). Regular skeds are in operation on Monday, Wednesday and Friday, and also with G3OYM/T (Tutshill, Glos.) hoping for pictures one day!

G3HAZ (Birmingham 31) says that many 70cm operators are unaware why 432/4 Mc/s was the band accepted by the Region I I.A.R.U. Conference for the " DX " portion, instead of, say, 434–436 Mc/s. (This was because of the truncation of the band at Geneva; commencing May 1 this year, most countries in Europe only have 430/440 Mc/s for all amateur purposes, so 432–434 Mc/s was chosen for sound transmission leaving 434–440 for amateur TV). The 432–434 Mc/s Band Plan is on the same lines as that for 144–146 Mc/s.

G3HAZ has submitted the following list of frequencies:

EI2W	433·80 Mc/s	G3KHA	434·7 Mc/s
G2ADZ	433·03 Mc/s	G3KMP	433·75 Mc/s
G2AFD	432·345 Mc/s	G3KMT/A	433·46 Mc/s
G2BVW	434·15 Mc/s	*G3KPT	433·44 Mc/s
G2CIK/T	434·69 Mc/s	*G3KQJ/T	433·46
G2CIW	433·20 Mc/s		(435·96) Mc/s
G2DCI	433·01 Mc/s	*G3LAY	433·25 Mc/s
*G2FNW	433·35	*G3LGJ	433·8 Mc/s app
	(434·7) Mc/s	G3LHA	433·38 Mc/s
*G2OI	433·56 Mc/s	*G3LQR/T	435·4 Mc/s
*G2XV	434·25 Mc/s	G3MED	434·93 Mc/s
*G3BA	433·15 Mc/s	G3MTI	432·342 Mc/s
*G3CCH	434·74 Mc/s	*G3MXW/T	433·33
*G3ENY	434·15 Mc/s		(434·17) Mc/s
*G3GZM	434·76 Mc/s	*G3MXY/T	434·46 Mc/s
*G3HAZ	433·275 Mc/s	*G3MYD/T	433·34
G3HBW	433·34 Mc/s		(434·25) Mc/s
G3HYH	434·2 Mc/s	*G3NNG	434·7 Mc/s
*G3ILX	433·85 Mc/s	*G3NOX/T	434·3 Mc/s
G3IOO	434·4 Mc/s app.	*G3OAT/T	434·6 Mc/s
G3IRA	435·48 Mc/s	G3OYM/T	435·6 Mc/s
*G3JHM	435·6 Mc/s	*G5QA	434·2 Mc/s
G3JMA	434·39 Mc/s	G5YV	434·05 Mc/s
*G3JWQ	434·10 Mc/s	*G6GN	434·16 Mc/s
*G3JZG	433·32 Mc/s	*G6XA	433·25 Mc/s
*G3KBS/P	433·96 Mc/s	*GW3ATM	435·9 Mc/s app
*G3KFD	434·9 Mc/s		

* Indicates fairly active.

G5ZT (Plymouth) worked GW3ATM for a first mobile QSO on June 7 at 18.15 G.M.T. and will be mobile on 70cm and 2m every Wednesday from 19.00/22.00 G.M.T. from Haytor, Devon. QSO first on 2m then over to 70cm. All interested stations (and there are surely many) please look Devon-wards! G5ZT very much appreciates the calls when mobile as it is his only real chance to work DX.

G3LTF (Galleywood) now runs a sked with G2CIW each night (21.30 G.M.T.) which is fairly successful. Other stations heard and worked since May 18 have been G3CCH,

G3HAZ, G6XA, whilst on June 4, ON4HN, G4SA, G4TA and G4LN were all worked, with ON4HC heard. On June 13 G2CIW and G3KPT were worked.

G3LQR/T (Dedham, Essex) found June 4 and 5 excellent for ON stations, with ON4SA worked for a new one. ON4LD, ON4TA, ON4HC and ON4HN were also on the band, so there is plenty of activity in Belgium. During this period G3LQR/T received very good pictures from G3NOX/T. On June 16, a few Midland stations were heard, but only G3LHA was worked. June 17 brought a contact with G3MPS (Farnborough). At about 22.00 G.M.T. the same day a weak c.w. signal was heard calling CQ on 435·1 Mc/s which is believed to have been F2ZD (RST339); the symbols F2(?)D were definitely resolved. G3LQR/T now uses 434·47 Mc/s as well as 435·35 Mc/s.

Four Metres

G6XX (Howden, Yorks) sends a welcome report after a long absence, and says the main activity is now on 4m as 2m has been poor lately. Local 4m operation is very high and includes G4OF (Gainsborough), G3HRP, G3KNP (Scunthorpe), G3GCX, G3DSA and G3FFV (York), G3BPD (Doncaster), G5PW, G6BX, G8CB (Bradford) and G5CP/A (Chesterfield). All these stations are regularly on the air Sunday mornings. The only DX heard regularly is G3EHY and "he takes a lot of raising." What about it, you Midlanders, Southerners and Home Counties men? Look North, there is a fine array of new calls to work.

A.1657 (Gomersal, Leeds) has acquired a new 4m c.c. converter of the G2IQ variety which is certainly a vast improvement on his old one, and lists a fair number of 4m stations heard, including some new ones.

G3GNN (Doncaster) should be active shortly, while a report from G3OQX says that G3NKJ may soon be on 4m. Others on the band include G3DTA (York), G3GJV (Batley), G3MZC/M (Bradford), G3NAO (Dewsbury), G3OGV/M (Shipley) and G3OKS (Halifax).

GM2FHH (Aberdeen) is still pegging away, but the only QSOs made till recently were with GM3FGJ (Edinburgh) and GM3GUI (Friockheim). Does anyone want a 4m sked?

The Research-G.E.C. Amateur Radio Society is now operational on 4m under the call G5FK (the station is nearly ready for 2m and has plans for 70cm and 3cm). The club station is about 150 ft. a.s.l. at Wembley, with permission to use a 200 ft. tower for serious work. Lunchtime working is envisaged, and skeds for all bands (including 160m!) are welcomed.

A.2122 (Ashtead), submitting his first report, says that he has heard 8 stations, all during the Contest on June 17-18. These were: G5FK, G3KEU/P, G3CLW, G3MCS, G3NDF, G2AIH, G3KQC and G3IUL. The receiver is an RF27 plus HRO and the aerial an indoor 4m dipole running north/south. The position is 225 ft. up on the side of a hill, the only decent direction being to the west.

I.A.R.U. Region I V.H.F. Contest 1961

THE rules for this year's I.A.R.U. Region I V.H.F. Contest to be held on September 2-3, are as set out below. It should be emphasized that contacts between U.K. stations score equally with contacts between U.K. and continental stations. There is in fact no reason why British entrants should not amass very creditable scores without working any continentals. Particular attention is drawn to the duration of the contest (Rule 4).

Rules

1. **Eligible Entrants:** All licensed radio amateurs resident in Region I. Multiple operator entries will be accepted provided only one call-sign is used.
2. **Contest Sections:** The contest will comprise the following sections:
   (i) Fixed stations—144 Mc/s.
   (ii) Portable/mobile stations—144 Mc/s
   (iii) Fixed stations—420 Mc/s
   (iv) Portable/mobile stations—420 Mc/s
   (v) Fixed stations—1250 Mc/s
   (vi) Portable/mobile stations—1250 Mc/s.

   Portable/mobile stations must operate from the same location throughout the event.

   Fixed stations should give their exact locations but if operating from call book addresses need not do so. Portable/mobile stations should give their locations in distance and direction from the nearest town, or by QRA Locator.

   All operators must be licensed. Licence regulations, particularly regarding power input, must be strictly observed.
3. **Date of Contest:** The Contest will take place on September 2-3, 1961.
4. **Duration of Contest:** The contest will commence at **18.00 G.M.T. on Saturday, September 2,** and will end at **12.00 G.M.T. on Sunday, September 3.**
5. **Number of Contacts:** Each station can be worked once only on each band, whether fixed, portable or mobile. If a station is worked again during the contest on the same band only one contest will count for points but any duplicate contacts should be logged without claim for points and should be clearly marked as duplicates.
6. **Types of Emission:** Contacts may be made on A1, A3, A3a or F3.
7. **Contest Exchanges:** Code numbers exchanged during each contact shall consist of the RS or RST report followed by a serial number commencing at 001 for the first contact and increasing by one for each successive contact.

   In U.K. countries, it is customary to use a band identification letter (A for 144 Mc/s, B for 420 Mc/s and C for 1250 Mc/s). Should this letter be used or not used, no penalty will be exacted. The locations of stations as defined in Rule 2 shall also be exchanged.
8. **Scoring:** Points will be scored on the basis of one point per kilometre. The final claimed score must be shown at the top righthand corner of the first sheet.
9. **Entries:** Entries must be set out as shown in the example below. Entries from competitors in the U.K. must be sent to **F. G. Lambeth (G2AIW), R.S.G.B. V.h.f. Manager, 21 Bridge Way, Whitton, Twickenham, Middlesex, postmarked not later than September 16, 1961.** The judging of the entries will be the responsibility of the Swedish National Society, whose decision shall be final.
10. **Disqualification:** Entrants deliberately contravening any of these rules shall be disqualified. Minor errors may result in loss of points. Errors in call-signs and code numbers will be penalized by deducting the following percentages of claimed scores for both stations: 1 error 25 per cent, 2 errors 50 per cent, 3 or more errors 100 per cent. The claimed contact will be disqualified for (*a*) an obviously wrongly stated QTH, (*b*) a time error of more than 10 minutes.
11. **Awards:** The winner of each section will receive a certificate.

Sample Log Sheet

I.A.R.U. Region I V.H.F. Contest. Sept. 2-3, 1961. Claimed Score.....

Section..... Call-sign.....

Name .....

Home address.....

Location of station.....Latitude ..... Longitude.....

Height above sea level in metres.....

Transmitter.....Input power.....watts

Operating frequencies.....Crystal or v.f.o.?

Receiver .....Aerials.....

Date/Time G.M.T.	Call-sign	Serial Numbers		QTH	Emission	Distance km	Points claimed
		SENT	RECEIVED				

Declaration; I declare that this station was operated strictly in accordance with the rules and spirit of the contest and I agree that the ruling of the organizing society shall be final in all cases of dispute.

Date..... Signed.....

THE MONTH ON THE AIR

A CHRONICLE OF EVENTS ON THE HF AMATEUR BANDS

By R. F. STEVENS (G2BVN)*

DURING the past month conditions have been mainly in accordance with the predicted pattern, 1·8, 3·5 and 28 Mc/s have produced relatively little in the way of DX, which has been mainly concentrated on 14 Mc/s with some support from 7 and 21 Mc/s. For those who feel that the sands of DX are running out there is consolation in the knowledge that although the sunspot activity will be less during the coming winter than at the present time, the daytime maximum usable frequency (m.u.f.) will be higher. In order to arrive at a forecast of conditions one must take into account three types of variation which are occurring simultaneously. These are: (i) the daily variation giving a higher m.u.f. during the daylight hours than at night, (ii) the seasonal variation producing a higher m.u.f. during the winter months than during the summer, and (iii) the decreasing sunspot activity which tends at all times to reduce the m.u.f. Generally, the m.u.f. is reached later in the day in the summer than during the winter, and also during the summer months there is a considerable increase in short skip openings up to about 1,500 miles produced by reflection from the sporadic *E* layer. These openings may occur on higher frequencies (e.g. 28 Mc/s) than those on which communication is possible by the usual layers. Sporadic *E* usually reaches its peak during the month of July and is most frequently encountered between 09.00 and 15.00 local time.

On the low frequency bands ionospheric absorption is an important factor and this tends to decrease with the reduction in sunspot activity, which means that signals on 3·5 and 7 Mc/s may be stronger in the years ahead than during the peak of the sunspot cycle. Ionospheric absorption is at its lowest at the m.u.f., and, will, for instance, be four times as great on 14 Mc/s as on 28 Mc/s, which partially accounts for the strong signals produced by low power on the latter band. From the information now available it seems certain that there will be trans-Atlantic openings on 21 Mc/s during October followed by occasional openings on 28 Mc/s in addition to the north-south paths which are now workable.

Whilst on occasion the use of high power is an aid to the maintenance of perfect communication it is by no means the answer to all problems. According to information provided during contacts some stations have power amplifiers using two 813 valves. Whilst it is possible that these could be run at an h.t. voltage of 500, it is extremely unlikely that this is being done, and it is pointed out that, contrary to comments heard on the air, there are no special high power permits for frequencies below 30 Mc/s. Also, before using QRO to make that cross town QSO check paragraph 4(1) of the Amateur (Sound) Licence.

News from Overseas

9M2AD is the present call of ex-MP4TAF and VS9ADL, and ex-VS9AJW now signs **9M2FN.** The address of both stations will be found in *QTH Corner*, and the operators will be pleased to send cards for contacts from MP4 and VS9. Due to poor returns cards are only sent out on receipt of an incoming QSL.

EP2BD is now active from Kharg Island and has a cubical quad aerial in operation. Iain reports that the best band appears to be 21 Mc/s, the main disadvantage of 14 Mc/s being the high noise level.

5N2FNX/ZD2FNX is now in the U.K. and any QSL cards should be sent via the R.S.G.B. Bureau. Cards that have been sent to the Nigerian address will be forwarded. It is hoped to resume operation under the call G2FNX in the near future.

MP4MAH has closed down and is returning to VU2TA. This, advises VS9AAC, will leave Muscat and Oman without permanent representation. Alan reports HS1F and HS2M both active on 14 Mc/s c.w.

VK9GK is active from Port Moresby during the weekends on 14 and 21 Mc/s looking particularly for U.K. contacts and can generally be found between 06.00 and 09.00. It is hoped to commence operation on s.s.b. when a phasing type exciter is completed.

G3MJL is on a tour of duty in **Netherlands New Guinea** and is awaiting allocation of a call-sign. Hearing the treatment afforded to DX stations he makes the plea for operators to call either h.f. or l.f. of his own frequency.

ZA1KFF and **ZA1KFA** have been frequently logged on 14 Mc/s c.w. usually during the morning hours. It is reported that ZA1KFJ is constructing a s.s.b. transmitter for use on 21 and 14 Mc/s. Your conductor will be interested to hear from any station who is lucky enough to receive a card from any of these stations.

After a tour of duty in Antarctica **VK0JH** has now returned to his home QTH and outstanding QSLs are being sent out through the Bureau. VK0JH asks for s.w.l. reports on his signals between August 1960 and February 1961. These should be sent to 77 Channel Highway, Taroona, Tasmania.

Following the note last month regarding operation by s.s.b. stations on frequencies below the U.S. 'phone band, there seems to be world wide approval for the idea, which if carried through should end the current trend of operation supervised by a master of ceremonies, which is not necessary and capable of abuse. There is strong support for the idea from the U.S.A. and Canada (see *Single Sideband* on page 33).

DXCC News

Damao and **Diu,** the Portuguese territories on the west coast of India, have been accepted as separate countries for DXCC credit after October 1, 1961.

The A.R.R.L. has refused to give **St. Paul Island** separate country status, ruling that the Probiloff Group are part of the Aleutian chain.

In the latest DXCC listings **G4CP** and **G3AAM** are both credited with **300** countries confirmed. Congratulations to the operators concerned—how about some information on how this milestone has been achieved?

* *Please send all reports to R.S.G.B. Headquarters to arrive not later than July 20.*

It is reported that the South African P.M.G. Department has stated that there will be no change in the call-signs used by stations in the new Republic.

TD8 will be the new prefix for operation from the Republic of **Dahomey.** The new prefix for Madagascar is **5R8.**

Copies of the current **country list** may be obtained from R.S.G.B. Headquarters or G2BVN, price 6d. or one IRC.

DXpeditions

ZL3DX will be making a trip between August 9 and September 4, operating from **Soloman Is. (VR4), New Caledonia (FK8)** and **New Hebrides (YJ1).** The frequencies will be: s.s.b.—14306, 14348, 21406, 21448; c.w.—14040, 21040 kc/s.

JY2NZK, the first station heard from Jordan for a considerable period, created tremendous pile-ups whenever he put in an appearance, which was usually on 14 Mc/s s.s.b. although c.w. was also used. This operation was not basically a DXpedition as the persons responsible (VQ4NZK and HB9PL) were part of a film company on location in Jordan. The address for QSLs will be found in *QTH Corner.*

5N2AMS caused considerable activity when operating as 5U7AMS/M from the Niger Republic, and hopes to repeat the performance with some weekends of operating from the Republic of Dahomey as TD8AMS. Contrary to a comment heard on the air Angus Murray-Stone was operating with full written authority from the Niger Minister of the Interior. Due to the difficulty of static power supplies in this part of the world, 5N2AMS will be fully equipped for mobile operation, and it is expected that most of the activity will be concentrated on 21 Mc/s a.m. During his leave in October Angus hopes to obtain permission for a two weeks' spell of operation in Volta.

FP8BQ was the call-sign expected to be used by K1MMB when operating from St. Pierre, but at the time of writing no signals had been heard from this location. (G3NYA).

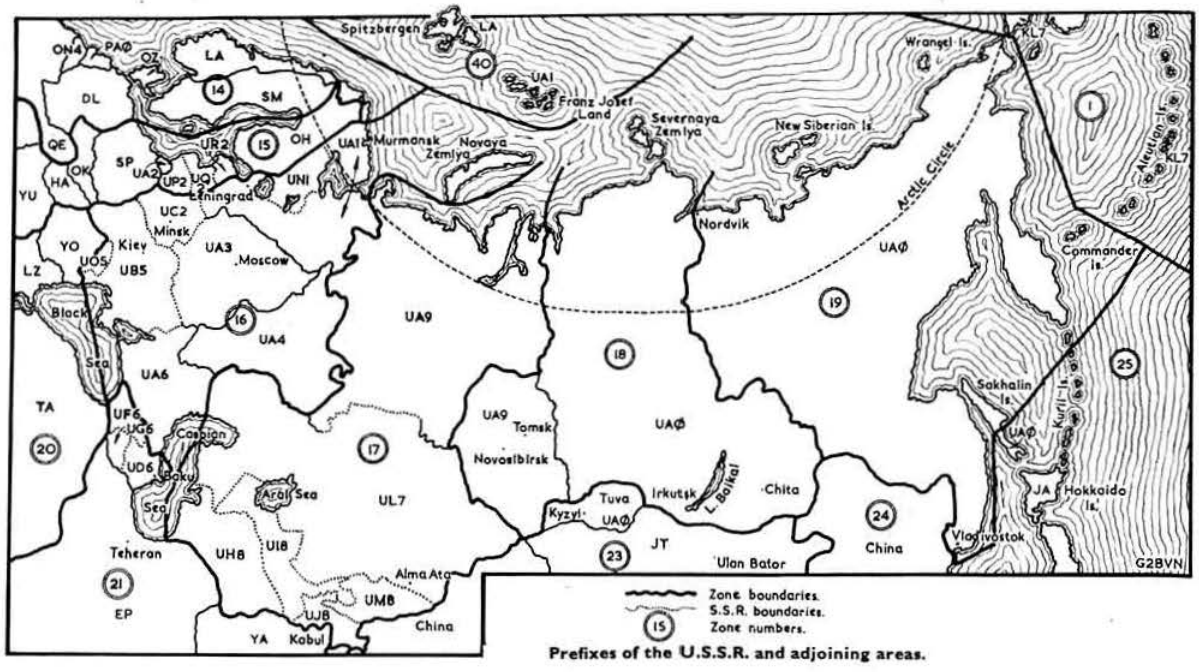
Through the courtesy of Bryan Bisley, G3OFI, EP2BG, MP4QAO, etc., full details of the trip to the **Neutral Zone** are available. Following some 330 QSOs made from Kuwait during June 8 and 9 under the call 9K3TL, operation from the town of Wafra in the Southern Neutral Zone commenced on June 10 and finished on June 16. A total of 1,870 contacts were made, mainly on 14 Mc/s s.s.b. and c.w. with a few QSOs on c.w. on 7 and 21 Mc/s. The operators concerned were Jack (HB9TL), Rundy (OD5CT), Vic (W1TYQ) and Bryan (G3OFI). The equipment consisted of a Collins KWM-2 with a 14 Mc/s ground plane, and two multi-band dipoles. Generally, conditions were poor and comparitively few W QSOs were made, the West Coast stations not being heard at all. Operating manners were usually good but a few stations calling on the DXpedition frequency together with some " klub " operators made life difficult at times. Bryan is very critical of certain aspects of the band habits of some of the North American stations, particularly with regard to the phone patchers asking for a clear channel, and it is certain that all DX operators will be with him in this matter. From the receiving end the c.w. operation of **9K3TL/NZ** was very smooth, and DX'ers will be grateful to the persons concerned for providing, it is hoped, a new DXCC country.

G3OFI is now based in Beirut, where he is hoping to be licensed as OD5EB, but intends to make periodic trips to the various Persian Gulf states, where he already holds licences. During the next winter operation will take place on 3·5 and 7 Mc/s c.w. and s.s.b.

Following the operation from Turkoman under the call **UH8DA,** the Russian portable s.s.b. transmitter is scheduled to be taken to Moldavia (UO5) and Kaliningradsk (UA2), either of which may have materialized by the time this is being read.

Contests

The **Second All Asian DX Contest** organized by the J.A.R.L. will take place from August 26 at 10.00 until the following day at 16.00. Operation is on c.w. only on the bands from 3·5 to 28 Mc/s. The serial numbers to be exchanged consist of the RST reports plus two figures giving the age of the operator, except in the case of YL operators who may send " 00 " in lieu of their age! High scoring stations from the U.K. in the 1960 contest were G4CP and G3AAE. A six page leaflet giving full results of the 1960



Prefixes of the U.S.S.R. and adjoining areas.

contest and rules for the current event may be obtained by sending a s.a.e. to G2BVN.

High claimed scores in the **A.R.R.L. DX Contest** held over four weekends in February and March include: c.w.—W3ECR 554,694; W9NZM 544,275; W4HYD 513,786; 'phone—KP4AVQ 297,888; K2GXI 247,401; W1ONK 204,666.

Awards

The **U.S.A.-Counties Award,** sponsored by *CQ*, which was mentioned last month, is available in seven classes each with a separate certificate. Full details of the award together with maps and space for listing of contacts, are provided in a 108 page booklet which can be obtained from CQ for $1.25. The applications will be processed by K6BX.

The *Russian Call Book* produced by the Polar Bears Radio Club, c/o Solsgardsgatan 15, Ornskoldsvik, Sweden, is now available from that address. The list details nearly 1,000 stations in the rarer U districts and countries, giving zone and oblast number.

The **Directory of Certificates** produced by **K6BX** and providing the most comprehensive and up to date listing of awards in the world is available for a yearly subscription of 30/-, which includes three free revisions. The small price increase is due to a rise in U.S. postage rates as from July 1. The *Directory* may be ordered from G2BVN, and a three ring binder to hold the book can be supplied for an additional 7s. 6d. Both Directory and revisions are supplied direct from the U.S.A.

DX Briefs

A new set of radio regulations came into effect in **Bermuda** on July 1 and new licences are to be issued. Non-domiciled operators will use their own calls with the suffix VP9, i.e. G2BVN/VP9.

All QSLs for the 19 calls held by Bryan Bisley (MP4BDA, etc.) should be sent to R. Baines, 81 Kitchener Road, Strood, Kent. SWL cards for PK1SX should also be sent to this address.

SV0WT who is currently active from Crete has asked that all QSLs should be sent via the I.S.W.L. Bureau, as direct mail may lead to trouble with the military authorities.

OZ1MR, active on 7, 14 and 21 Mc/s is the wife of OZ1PR, Paul Rasmussen, and hails from Carshalton, Surrey. She is particularly anxious to contact G stations. (G3ISX).

It may be of interest to short wave listeners to hear that **B.R.S.3129** now has **304** countries confirmed, which is certainly a tremendous achievement. He is closely followed by SM3-3104 who has reached the 300 confirmed mark recently. B.R.S.20104 draws our attention to a s.w.l. column now appearing in *QRV*, the journal of the R.A.F.A.R.S.

CONTESTS DIARY

July 16	-	Second 420 Mc/s Open Contest (See page 583, June 1961)
July 16	-	Swiss National Mountain Day
August 19-20	-	Scandinavian V.H.F. Contest
August 26-27	-	All Asian DX Contest
September 2-3	-	I.A.R.U. Region I V.H.F. Contest
September 9-10	-	S.S.B. A.R.A. WAS
September 10	-	D/F National Final
September 17	-	Low Power Field Day
September 30-October 1	-	VK-ZL Contest (telephony).
October 7-8	-	VK-ZL Contest (c.w.)
October 8	-	R.A.E.N. Rally
October 28-29	-	CQ WW DX (telephony)
November 11-12	-	Second 1·8 Mc/s Contest
November 25-26	-	CQ WW DX (c.w.)
December 2-3	-	R.S.G.B. 21/28 Mc/s Telephony Contest R.S.G.B. 21/28 Mc/s Telephony Receiving Contest
December 3	-	OK DX Contest

**To coincide with dates of I.A.R.U. Region I v.h.f. contests.*

One of the best known DX'ers, G5DQ, in his station.

VR3L is still active from Christmas Island and was worked by G6XL on June 19, his first G QSO since April 6 when the station at this end was again G6XL. G6XL considers these were freak openings as Pacific stations were not being heard around 07.00 when the last QSO was made.

KH6EDY is active from Kure Island mainly on s.s.b. around 14,340 kc/s at 06.30 to 07.30. His address will be found in *QTH Corner*. The name of the operator should be given on the QSL.

VR4CB in the Solomon Islands may be found on the low end of 14 Mc/s on a.m. around 07.00. Arrangements have been made for QSLs to be handled by W7PHO.

UA1KED now active from Franz Josef Land is said to be leaving there in August, and QSLs will be mailed on returning to his home QTH.

Operators wishing to arrange a schedule for a QSO with **VP8EG** on the South Orkneys should contact G8KS, to whom QSLs should be sent with the usual reply postage.

MP4BBW, back in Bahrein from his round the world tour, records declining band conditions but continues to add to his totals: DXCC 216/199; WPX 383/353 and WAZ 40/39, all on s.s.b.

PK1SX is active on s.s.b. usually around 14.00 on the high end of 14 Mc/s. The gear is located some distance from the living quarters which accounts for reduced operating hours.

Operators who sent **HK0TU** cards to the Swani Radio Club, only to learn later that they should have gone to HK3LX, will be pleased to know that QSLs to the former address have all been forwarded, and replies should be in the mail in the next few weeks.

EA0AC, very active on s.s.b. from Spanish Guinea, has now returned to Spain on six months leave. Cards may be sent via the EA Bureau.

VS9MB hope to be on the air with s.s.b. in the near future when an S.B.10 arrives and is built. It is understood that this unit is a gift from W4TO.

There has been a considerable improvement in the **HV1CN** QSL situation and cards now appear to be flowing freely. As before, these should go via W2BIB with postage if a direct reply is desired.

Tailpiece . . . after 30 years of hamming an operator was told by his wife he must choose between her and Amateur Radio. He said " it's a pity—because after all I'm going to miss her " (B.R.S.20104).

Band Reports

The **1.8** and **3.5 Mc/s** bands have produced very little in the way of DX, ionospheric absorption and high static levels being typical of summer conditions on these bands. B.R.S.20317 reports **K3MBF** in QSO with a K1 on 1820 kc/s c.w. at 03.20 with **3V8CA** logged on 3·5 c.w. at 22.45. It is known that a number of DX stations are erecting aerial systems in preparation for the improved winter conditions, but unfortunately G3OFI was unable to obtain permission for operation on 1·8 Mc/s from OD5 or MP4, but will be active on 3·5 Mc/s. MP4BBW and PZ1AX are two others known to be setting up for operation on this band.

The **7 Mc/s** band has been quite productive mainly during the evening hours, with openings to South America and the U.S.A. being noted from 22.30. Unusual stations logged by B.R.S.20317 include **VK5KO** (21.00 to 22.30 calling Europeans with no answers); **AP5B** (22.37); **5N2JKO** (23.30); **ZD7SA** (02.40 causing extensive W pile-ups); **CE1AD** (22.55); **VP3SC** (calling CQ with no takers at 22.25) and **KV4CI** (22.30). North American stations have been heard at good strengths around 23.00 with an outstanding signal from **VO1FP** (22.30). As with the lower frequencies improved results may be expected on 7 Mc/s during the winter months, particularly now that a number of stations are using directional aerial systems such as the two or three element trap beams or the Birdcage.

Most of the DX traffic has been on **14 Mc/s** during the past month, divided in about equal proportions between c.w. and s.s.b. Dealing with c.w. first the Neutral Zone station, **9K3TL/NZ,** dealt very smoothly with large sized pile-ups and provided an example for others to follow. Other very worthwhile DX included **EA0AB** (18.00), often with a roughish note, but QSLs very promptly; **TU2AL,** at various times from 07.00 to 23.00, usually working North American stations during the evening periods; **ZD7SE** (08.00) who has the same QSL manager as ZD7SA, i.e. W9FJY; **JZ0PH** (14.00) recently very active from this rarish DX country; **ZK1AR** (06.00) from the Cook Islands. From Zone 23 **JT1KAA** (17.00) and **UA0KYA** (up to 12.00) have provided workable signals. From the West **VP2AD** (23.00); **VP2ST/P** (20.00); **VP3YG** (21.00) and **FG7XC** (23.00) have all been worked by European stations. The QSOs between G6XL and VR3L (07.00) have already received mention, and G6XL reports working DXpeditioner **JY2NZK** at 07.45. W stations have been heard calling **UA1KED** on Franz Josef Land during the late evening hours but unfortunately the latter has not been audible in the U.K. at that time. Although there have been some very blank periods the c.w. section of this band repays a careful listen.

On s.s.b. the two DXpeditions already mentioned, JY2 and 9K3 were very active and caused considerable congestion and at times some bad feeling was caused by the behaviour of several eager beavers calling on the DXpedition transmitting frequency, thereby ruining many QSOs. Another form of farmyard behaviour which has been noticed recently is that after failing to raise the DX station, TH1NG will then remain on the frequency and make a lengthy CQ call. Nearer home **LX3MA** furnished an unusual one on this mode, and QSLs should go via DL4US. **PK1SX** has been worked at various times up to about 16.00, which is the latest time that one is likely to find him on the band. Reports also tell of operation as **K3HVN/PK,** this is apparently in an attempt to obtain the raising of the F.C.C. ban on QSOs with U.S.A. stations. MP4BBW lost no time in re-entering the race, but talks of poorer conditions with higher static levels, and of the band closing earlier. Ian accounted for all the DX already mentioned together with **CR7CR** (14.34) who does not seem to be well heard in Europe these days; **HH9DL** (22.18); **UH8DA** (17.15); **9N1SM** (13.02); **6O1DRS** (16.28); **VR1G** (a.m. 20.09); **HS1X** (14.05); **PJ2AA** (00.32); and numerous **KH6s** around 18.00. **KG6IJ** has recently put Iwo Jima on the DX map with good signals around 15.00 to 18.00, usually at the weekends, and G8KS reports a rapid QSL. Zone 18 has been well heard in the person of **UA0BP** at various times between 07.00 and 18.00. **VR6AC** continues to put in appearance some mornings around 07.00, and several European stations have been lucky enough to make a QSO. Summer conditions make this path rather chancy, and unfortunately short skip has been present at the same time, completely covering the DX. The Western Carolines have been QSOd around 14.00 with **KC6CG** operating. QSLs after May 15 should go via VE7ZM. The Eastern Carolines have been noticeable by their absence, and as far as is known the many stations who contacted **KC6UZ** are still awaiting the pleasure of a QSL. **GM3JDR** continues to annihilate the DX with his dipole and TT21, recording almost all the stations already noted together with **M1B** (12.00); **VQ3GX** (14.00), who is often heard with his wife, who hails from

(Continued on page 32)

QTH Corner

AC5PN	via W8PQQ.
FG7XC	via W3GJY.
FO8AU	E. Poroi, P.T. Moerai, Ile de Rurutu.
HS2M	M. Pioso, S.E.A.T.O.-M.P.O., A.P.O. 146, San Francisco, California, U.S.A. or via K4JEY.
JT1KAA	Box 639, Ulan Bator, via Moscow.
JY2NZK	Box 35, Geneva 15, Switzerland.
JZ0PH	J. Hesp, 1953 Hortensiaweg, Biak, Netherlands New Guinea.
KG6IJ	via W6ZEN.
KH6EDY	A.R.S. KH6EDY, U.S.C.G. Loran Station, Navy 3080, c/o F.P.O., San Francisco, California, U.S.A. or via VE7ZM.
KL7 Bureau	Box 6226, Airport Annex, Anchorage, Alaska.
KP4 Bureau	J. Gonsalez, P.O. Box 1061, San Juan, Puerto Rico.
LU2ZR	via W9LGR.
OH0A	S.R.A.L., Box 306, Helsinki, Finland.
PK1SX	via K3HVN.
PZ1BH	P.O. Box 547, Paramaribo, Netherlands Guiana.
SL3ZO	Polar Bears R.C., Solsgardsgatan 15, Ornskoldsvik, Sweden.
TN8AT	P.O. Box 108, Brazzaville, Rep. du Congo.
TN8AU	P.O. Box 41, Brazzaville, Rep. du Congo.
UA2AO	A. Moskalenko, Main P.O. Box 77, Kaliningradsk Oblast, S.S.R.
VK9GK	G. S. Kiernan, c/o T.C. (A) Transmitters, Port Moresby, Papua.
VP6PX	via W2CTN.
VP7BV	R.C.A., San Salvador, c/o Patrick Air Force Base, Florida, U.S.A. (or via W4OIA).
VR1G	via W6BSY.
VR4CB	via W7PHO.
VR6TC	via W4TAJ.
W2LNP/SP3	via W2LNP.
YV3EJ	Box 163, Barquismeto, Venezuela.
ZA1KFF	Verdsklash Technical Institute of Culture, Box 888, Tirana, Albania.
ZK1BS	via W7ZAS.
3A2AR	via W2CTN.
5A2TG	(ex-VQ4GQ, VQ1SC), S. Crabtree, No. 1 Forces Broadcasting Station, B.F.P.O. 57
5N2AMS	A. Murray-Stone, c/o M.O.W., Minna, Nigeria.
6O1LB	Box 136, Mogadiscio, Somalia.
9M2AC	T. B. Gilooly, 23A Assam Kumbong Road, Taiping, Malaya.
9M2AD, 9M2FN	Sgt. D. Leese, H.Q. Sqn., Royal Dragoons, Ipoh.
9M2DL	W. P. Sandeman, 1351 Clifford Road, Kuala Lumpur.
9M2FW	P. R. J. Nicholls, R.A.A.F. Station, Butterworth.
9M2FZ	Leong Wai Ching, 23 Lorong Hijau Dua, Penang.
9U5NC	Box 1138, Usumbura, Ruanda Urundi.

* * *

R.S.G.B. QSL Bureau: G2MI, Bromley, Kent, England.

DXotic Showcase

21 Mc/s c.w.:	FR7ZD, 15; HI8DGC, 23; TU2AL, 21; 6O1MT, 18.
21 Mc/s a.m.:	TU2AH, 14; YA1AO, 18; XW8AL, 15; 5U7AH, 16.
14 Mc/s c.w.:	FG7XC, 22; JT1KAA, 19; KM6BI, 07; UA1KED, 21; UA0KYA, 12; VR3L, 07.
14 Mc/s s.s.b.:	EA0AC, 11; KC6CG, 14; KG6IJ, 16; K1SFU/KS6, 08; VR6AC, 07; ZK2AB, 07.

The Twenty-fourth B.E.R.U. Contest 1961

ZC4IP takes top place again in High Power Section — G3IDC winner of Low Power

THIS year's contest was again well supported, 104 logs being received for the High Power Section compared with 106 last year. The Low Power Section had one more than the previous year with 20 entries and the Receiving Section was one fewer with 11 entries.

George Barrett (ZC4IP), last year's winner, scored 3,719 points from 464 contacts and again won the High Power Section by a margin of 230 points. W. E. Russell (G5WP), who was placed tenth last year, gathered 3,489 points from 265 contacts to claim second place from D. L. Courtier-Dutton (G3FPQ) with 3,459 points from 277 contacts.

In the Low Power Section, F. Johnstone (G3IDC) takes pride of place with 1,955 points from 163 contacts. S. Coosner (ZS4MG) was a very close second with 1,929 points from 172 contacts while W. Houseman (ZL3US), came third with a score of 1,867 points from 131 contacts.

The winner of the Receiving Contest was W. E. Wilkinson (B.R.S.20317) with 3,099 points followed by R. W. F. Thomas (B.R.S.15822) with 2,573 points. E. H. Sherlock (B.R.S.6604), last year's winner, scored 2,510 points and took third place.

Most contestants found the new date satisfactory. A few found conditions poor but everybody seemed to have enjoyed themselves once again. Various comments and suggestions will be studied by the Contests Committee when the rules for the 1962 Contests are drafted.

On the whole, the logs were very good. Only one station could not add correctly and three managed to get their report columns reversed. However, 20 per cent of the entrants did not complete the declaration properly, leaving out the input to the final stage of the transmitter although half of them typed (or wrote) the six dots as showed in the December, 1960, BULLETIN! This year they have not been penalized, the statement of power higher up on the cover sheet being accepted. The Contests Committee appreciate the amount of work involved in the preparation of the logs and thank the

HIGH POWER SECTION

Posn.	Call-sign	Points	Contacts	Posn.	Call-sign	Points	Contacts	Posn.	Call-sign	Points	Contacts	Posn.	Call-sign	Points	Contacts
1	*ZC4IP	3719	464	26	VK2GW	2015	175	52	G3KSH	1405	101	78	VE4JT	745	74
2	*G5WP	3489	265	27	VQ2WR	1979	196	53	VK2APK	1390	122	79	G3KHA	729	47
3	*G3FPQ	3459	277	28	G3BKF	1970	134	54	G5GH	1340	104	80	G8KU	695	55
4	*VE2WW	3401	394	29	*MP4BBE	1945	205	55	G5JU	1284	109	81	G6PJ	650	58
5	G5DQ	3214	227	30	5N2GUP	1889	239	56	G3FPK	1235	81	82	G4LX	640	40
6	G5RI	3183	263	31	*VS9AAC	1790	190	57	VE1PA	1210	150	83	G8QZ	619	40
7	*VQ2HR	3165	340	32	G3EYN	1780	152	58	GI3NKQ	1205	76	84	VK5JT	610	43
8	G3FXB	2940	228	33	*ZL4BO	1769	142	59	G3GWT	1196	95	85	ZS2U	560	32
9	*VE1TG	2727	386	34	VE2BV	1744	209	60	VQ4KPB	1145	89	86	VE3DU	520	52
§	VE3KE	2720	296	35	*VE4XO	1689	186	61	G3VW	1120	72	87	VE3CNB	479	52
10	*5N2LKZ	2643	317	36	VQ2CZ	1654	131	62	G3KHT	1075	76	88	G5HN	450	26
11	VE2UN	2550	342	37	VO1FB	1645	242	63	ZK1AR	1005	66	89	GW3CW	445	38
12	G5RP	2534	187		*ZL2PL	1645	125	64	G3GGS	980	68	90	VE1DB	429	34
13	*VK6RU	2460	228	39	VE1IM	1638	205		G3APN	980	80	91	VE3BGW	390	26
14	G3LET	2445	173	40	*VE3BMB	1631	191	66	G2GM	970	79	92	G3MWZ	385	21
15	*VO1DX	2380	320	41	G5ZK	1620	108	67	VK2VN	960	72	93	ZS6BJ	365	21
16	G2QT	2359	176	42	VE2YU	1575	203	68	G2DPD	920	84		VK4SD	365	21
17	*VU2XG	2344	229	43	*VP3MC	1535	153	69	G2BLA	915	55	95	ZS1O	340	24
18	G2DC	2209	170	44	G5VU	1515	123	70	G3MPB	890	57	96	G2ZR	305	17
19	G2BB	2200	172	45	G6OY	1500	120	71	VQ2MS	884	107	97	GW3IJE	294	18
20	ZC4GF	2164	277		G6VC	1500	120	72	VE6HG	875	88	98	G3WP	255	19
21	ZC4PB	2120	297	47	VE1EK	1470	190	73	ZC4SC	829	91	99	VK2OW	245	13
22	G3GFG	2109	161	48	VS1GZ	1444	113	74	G3JKY	825	65	100	VE1AGC	220	16
†	VE3BWY	2104	245	49	G3LHJ	1435	99	75	G2AJB	799	52		‡VK5RO	145	16
23	VE2AYY	2059	258	50	G3GEW	1434	115	76	ZK1AK	795	71	101	VE6VO	140	12
24	*ZL1HY	2055	167	51	VP9BO	1431	155	77	VK4XJ	780	48		‡VK5RK	115	11
25	*VK5NQ	2035	199												

LOW POWER SECTION

Posn.	Call-sign	Score	Contacts	Posn.	Call-sign	Score	Contacts	Posn.	Call-sign	Score	Contacts	Posn.	Call-sign	Score	Contacts
1	*G3IDC	1955	163	6	*VK7SM	1200	93	9	*VK4SS	880	64	14	G3HRY	675	54
2	*ZS4MG	1929	172	7	G3GNS	1135	96	10	*VK3ZC	835	59	15	ZE3JO	494	27
3	*ZL3US	1867	131	§	5N2DCP	1104	121	11	*ZE6JE	824	41	16	GM4GK	335	19
4	*VQ3HD	1755	142	8	*9G1BQ	1039	80	12	*ZL1MT	810	51	17	VK3RJ	244	17
5	G2DU	1500	110	§	G3OOU	890	66	13	VK2CK	700	56	18	VK7RY	135	7

RECEIVING SECTION

Position	Name	Points	Position	Name	Points
1	W. E. Wilkinson (B.R.S.20317)	3099	7	E. W. Trebilcock (B.E.R.S.195)	1020
2	R. W. F. Thomas (B.R.S.15822)	2573	8	P. Reynolds (A.1930)	1010
3	E. H. Sherlock (B.R.S.6604)	2510	9	M. F. Stanbridge (A.1543)	900
4	W. J. C. Pinnell (B.R.S.21624)	1330	10	H. M. Davison (A.2122)	510
5	H. J. Hunt (B.R.S.19965)	1090	11	D. M. Grantley (L.2022)	505
6	F. C. Powell (B.R.S.18461)	1085			

* *Certificate winners.* † *Invalid—Two operators.* ‡ *Invalid—No declaration.* § *Late entry*

contestants for their part in helping to make the checking easier.

Comments

" If this took place on February 18, I would have made a massive score "—*ZS1O*. " Enjoyed every minute of it and the standard of operating first class "—*ZC4PB*. " I was disappointed with the low activity in this contest "—*VK5NQ*. " I did not have too much trouble from the W-sters after I told one persistant caller that he was nearly 200 years late for B.E.R.U."—*VO1FB*. " Considerable difficulty was experienced from numerous W stations "—*VQ2HR*. " Pity so many DX stations call one after a B.E.R.U. call "—*VK4XJ*. " Thanks again for another B.E.R.U. contest " —*VK2OW*. " Didn't have much time but change to March for low sunspot years will be good "—*VE6VO*. " It is a great pleasure to participate in the *one* DX Contest of the year where a kilowatt plus gall is *not* necessary equipment " —*VE3BMB*. " The new date in March is a very welcome move "—*VE2YU*. " As always I found the contest most enjoyable "—*VE2WW*. " This contest still remains the outstanding event in the contest year for me "—*VE2AYY*. " This is my first time to enter B.E.R.U. Contest . . . I found it a very great pleasure indeed "—*VE1TG*. " This test seems to have more good operators using good operating practices than any one which I enter "—*VE1PA*. " I suffered very badly from various forms of QRM, i.e. receiver trouble—taking the family into town—bringing them back—hard chair—full ashtray, etc."—*GW3IJE*. " Another very enjoyable B.E.R.U. Contest "—*GI3NKQ*. " Very FB contest "—*G6VC*. " A real fine weekend's DX "—*G6OY*. " Joke of the B.E.R.U.—a UB6 calling CQ B.E.R.U."—*G3FXB*. " Paradoxically, disappointing but enjoyable "—*G2BLA*.

Check Logs

Check logs from G2CJ, G2MI, G3CXM, G3FTQ, G5MP, G5VO, G6RC, GI3NPP, VE1AE, VE1OM, VE2YA, VE3DH, VE4OX, VK3CT, VK5RX, VP8AI and VU2MD are acknowledged with thanks.

DX Conditions from Great Britain

(Based on a cross-section of B.E.R.U. Logs)

	MARCH 11, 1961
00.01	MP4, VP3, VQ2, VU2, ZC4 (7).
01.00	VE1, 2, 3, VO1 (3·5); VQ2, VU2, ZC4, 9G1 (7).
02.00	MP4, VE1, 2, 3, ZC4 (3·5); VP3, VQ5 (7).
03.00	VE1, 2, 3, ZC4 (3·5); VQ4, ZB1, ZC4 (7).
04.00	VE1, 2, 3, VP9, ZB1, ZC4 (3·5); VQ2, ZB1 (7).
05.00	VE3, ZB1 (3·5); 5N2 (7); MP4, VQ4, VU2, ZC4, ZS4, 6, 5N2 (14).
06.00	VE1, 3, ZL2, 3, 4 (3·5); VE4, ZL1, 2, 3, 5N2 (7); MP4, VQ3, 4, ZB1, ZC4 (14).
07.00	ZL3 (3·5); VE2, 4, VK2, ZL1, 2, 3 (7); VE4, VK2 (14); VQ2, 3, 4, VS9, VU2, ZC4, ZS2, 4 (21).
08.00	VE4, VK2, 5, ZB1, ZL1, 3, 4, 5N2 (14); VQ2, VS9, ZC4 (21).
09.00	VK2, 5, 6, ZL1 (14); VK6, 9, VQ2, VS1, 9, ZB1, ZC4, ZL1, 2, 5N2 (21).
10.00	VE1, 2, VO1, VP3, 9 (14); MP4, VS1, VU2, ZB1, ZC4, ZS6, 5N2 (21); VQ2 (28).
11.00	VE2, 3, VO2 (14); VK2, 5, VQ4, ZB1, ZC4, ZL4, ZS4 (21); VQ2, 3, 4, VS9, VU2, ZC4 (28).
12.00	VE1, 2, 3, VO1 (14); VE1, VK3, 4, 5, ZC4, ZL4 (21); VK6, VQ2, 3, 4, ZC4, ZS6 (28).
13.00	MP4, VE1, 2, 3, VO1, 5N2 (21); ZE3, ZS2 (28).
14.00	VE1, 3, 8, VK7, VO2, VS1, VU2 (14); VE1, 2, 3, VO1 (21).
15.00	VE1, 3, 4, 8, VK4, 5, VS1, ZB1, ZC4, ZL2, 5N2 (14); VE2, 3, 4, VO1, VQ4 (21).
16.00	VE1, 2, 3, 6, VO1, VS9, ZC4 (14); VE1, 2, 3, 4, VQ2, 3, ZE6, 5N2 (21).
17.00	VE1, 7, VS9, ZB1, 5N2 (14); VE1, 3, 5, VP3, ZS4 (21).
18.00	VE1, 3, 4, 5, 6, VP3, 9, ZS4, 5 (21).
19.00	VE1, 2, 3, 5, 6, 7 (14); VE3, 4, 5 (21).
20.00	VE1, VK2, 5, 5N2 (7); VE1, 2, 3, 6, VP9, VQ2, 5N2 (14).
21.00	VE1, 2, VK5, VO1 (7); VE2, 3 (14).
22.00	VE2, 3, VP8 (14).
23.00	VE2 (14).
	MARCH 12, 1961
00.01	VE2, 3, VO1 (7).
01.00	VE2, VO1 (3·5); VE2, 3, VP9 (7).
02.00	VE1, 2, 3, ZC4 (7).
03.00	ZC4 (3·5); VS9 (7).
04.00	VE1, 3 (3·5); VE1, 3 (7).
05.00	VE2, 3 (3·5); VE2 (7).
06.00	VE2, 3, VO1, ZL2, 3, 4 (3·5); VE3, ZL1, 3 (7).
07.00	VE1, 2, ZL2, 4 (3·5); VE3, VK2, ZL2, 4 (7); VK2, 5, ZL3 (14).
08.00	VE2, 3, 4, VK1, 2 (7); VK2, 3, 5 (14); VQ2, ZS2 (21).
09.00	VK2 (14); VK2, VQ2, ZC4, ZL2, 3, ZS1, 5N2, 9G1 (21).
10.00	VK4, VS6, ZL1 (21); MP4, VQ2, ZC4 (28).
11.00	VE1, 2, 3, VK2, VP9 (14); VP3, VS6 (21); MP4 (28).
12.00	VE2, 3, 4, VK2, 3, 4, VO1, VP9, ZB1 (14); VE3, VK6, VO1, VP9, VS6, ZE3 (21).
13.00	VE1, 3, 8, VK3, 4, 5, ZL4 (14); VE1, 2, 3, VP9, 9G1 (21).
14.00	VE1, 3, 6, VK3, 6, VS1, 6 (14); VE2, 3 (21).
15.00	VE1, 6, 7, VK6, VS6, 5N2 (14); VE1, 2, 3, 4, 5 (21); VQ2, ZS2 (28).
16.00	VE1, 3, VP4 (21); VQ2, ZE3 (28).
17.00	VE3, 7, VU2 (14); VE3, 5, 7, ZS1 (21).
18.00	VE2, 3, 5, 7, VQ4 (14); VE3, 7, VQ2, ZS1, 6 (21).
19.00	VK5 (7); MP4, VE1, 2, 3, VO1, VQ4, 5N2 (14).
20.00	VE1, VK2, VQ4 (7); VE1, 3, 4, VQ2 (14).
21.00	VE1, 2, VP9 (7); VE3, VP3 (14).
22.00	VE1, 2, VO1, VP3, 9, 5N2 (7); VE3 (14).
23.00	VE2, VO1, 5N2 (3·5); VE3, VO1 (7).

The Month on the Air (Continued from page 30)

Bournemouth, operating; **ZS7P** (18.35) and **9M2DB** (15.00), shortly coming to the U.K. on leave, it is believed. **UH8DA** operating the Russian portable s.s.b. transmitter from Ashkhabad has been well heard, usually in the afternoons and early evenings, and in company with UA3CR has dealt very capably with large numbers of calling stations.

The DX on **21 Mc/s** is mainly on a.m. although G3AAE recorded QSOs with **9K3TL/NZ** and **TU2AL** (11.15) on c.w. **VS9MB** from the R.A.F. station on the Maldive Islands is well received almost every day round about 16.00/17.00, often when there are very few signals to be heard on the band. Other stations worked include: **TT8AD** (16.20), **VS1KP** (16.30); **VS5GS** (16.50); **ZS8W** (15.08) and **9U5NC** (19.30). G8DL, who with his 7 watts of c.w. has worked 150 countries and 49 states, records **VP3MC** (15.50); **VP8EH** (18.30); **VS9AAC** (13.30); **6W8BF** (19.40) and **7G1A** (15.34). Our consistent reporter from Virginia, F.R.S. 309 shows that the DX on this band, whilst perhaps not up to the standard of previous months, is still there for the searching. This includes: **CP5ER** (10.14); **HI7CJY** (17.25) **HK3AK** (22.06); **OA4M** (23.26); **TG9BB** (19.55) and **VP3MM** (22.18). Reunion Island, whose only representative is **FR7ZD** has not been heard very much recently but reports are coming in of c.w. activity on this band between 10.00 and 16.00 around 21,050. Kerguelen Island, usually found on c.w., was worked by G3MVV on a.m. at 14.00, the call being **FB8XX**. In the latter connection it is reported that FB8XX and FB8ZZ will count for Asian contacts for DUF/4 until XW8 is reinstated.

The **28 Mc/s** band has apparently not produced any outstanding DX but paths to the South and South-West have been open frequently during the late afternoons and early evenings. There have also been short skip openings to the Continent during the afternoons.

Fifty Years Back . . .

On May 16, 1961 R.S.G.B. members EI4C and EI4B had a solid a.m. QSO on the 7 Mc/s band, the first between these stations since September 1912 when the transmitters consisted of a spark coil driven by bichromate batteries.

* * *

Many thanks to the correspondents who have written during the past month, particularly B.R.S.20317, G3AAE and G8KS, who filled in the gaps whilst G2BVN was undergoing radiation of the order 10^{-2} microns. Also to our regular sources of DX news, the *DX'-press*, the *West Gulf DX Club Bulletin* and *DX* (W4KVX).

Information on DXpeditions, overseas stations and band conditions will be welcomed, and should be sent to arrive at R.S.G.B. Headquarters not later than July 20.

Single Sideband

By G. R. B. THORNLEY (G2DAF) *

CONDITIONS for long distance contacts on the 20m band have deteriorated considerably since March 1960 when the American phone band was extended from 14,300 to the band edge on 14,350 kc/s.

During the years single sideband operators—accused by the A3 fraternity of occupying 50 kc/s and splattering all over the band and themselves anxious to avoid carrier heterodynes—have tended to keep together, usually in the top section of each band. On 20m this was the section 14,300 to 14,350 kc/s. It is now very much a fact that the W/K QRM in this portion of the band is intolerable and the effect on DX s.s.b. operation has, to say the least, been disastrous. A letter on this subject has been received from the Ontario DX Association on behalf of all sideband operators all over the world and was referred to in *The Month on the Air* last month.

With the closure of the 10m and 15m bands, due to the present adverse propagation conditions, 20m is the only band usable for world-wide contacts. Sideband DX operation has to all intents and purposes been pushed out of its traditional frequency spectrum. There is therefore a pressing need to find some other section of the band, free from North American QRM, and acceptable to all.

The net result is that nobody is happy with the situation as it is at present. In Canada, s.s.b. operators have been trying their hardest to convince DX operators throughout the world that the spot for both Canadian and DX s.s.b. is *below* 14·2 Mc/s—that is the "*lower* or *bottom* 40," the band of frequencies between 14,100 and 14,140 kc/s. Recently the idea, originally suggested by G2BVN incidentally in the BULLETIN, has been taken up by VR6AC, ZD1ES, LZ1WD, VP2AB, VK3AHO, ZL3IA, GI3KVO and ZL1ATQ—just a few of those finding the "bottom 40" comfortable.

Where Are We Going?

In *Technical Topics*, in the June issue of the BULLETIN, G3VA made the following comment: "But there are dangers as well as great advantages in the current interest in technical innovation. We need to keep a clear eye on where we are heading and whether we are really advancing or, like Alice, just running faster and faster to keep in the same place. One danger is the growth of technical myths which may in the end stultify progress rather than encourage it. An example from the recent past was the strong advocacy of series-tuned oscillator circuits which tended to obscure the equally valid advantages of parallel tuned circuits."

The writer is very much with G3VA on this issue and has in the past, as all readers of *Single Sideband* and *Communication Receiver Design Considerations* know, gone to some effort to explode the myths, the exaggerations and unfounded claims being made for certain "in vogue" circuit arrangements. Three of these were the series tuned v.f.o., the heterodyne detector, and the audio derived a.g.c. system. This was not done in any spirit of "big head," but with the clear realization that the amateur building and experimenting with radio apparatus is in fact an engineer, and engineers do not make either alterations to circuits, or try out new methods and then, by a process of wishful thinking, kid themselves that they have made a wonderful improvement. Worthwhile progress and improvement is only achieved by an engineer—be he professional or amateur—who eliminates the myths and deals with cold facts.

We are, unfortunately, living today in an age of fancy titles and unattached superlatives. A soap powder has to wash "whiter than white"; a high fidelity audio amplifier has to be more linear than linear—in fact "ultra linear." The aerial tuning unit mounted on the windowsill of every amateur shack of the 1930s has now become a "Z match." All series tuned oscillators are "Clapp v.f.o.'s," and all heterodyne detectors have become "product detectors." This is a very dangerous practice because the present generation of radio amateurs have little or no knowledge of radio history. A "Clapp v.f.o.," to them, is a wonderful new improved form of variable oscillator and a "product detector" has been especially developed and is essential for single sideband reception. Without these two new wonders a piece of amateur equipment must be poor and out of date. In fact, the series-tuned oscillator was developed by a B.B.C. engineer, long before amateurs started to use single sideband, for the control of medium wave broadcast stations where a very small tuning range of a few kilocycles only was necessary.

The English dictionary gives the definition of the word product as, "A number resulting from a multiplication." As a product detector is in fact a heterodyne detector, the output frequency is the *difference* between the two input frequencies. It could, of course, be the sum, as in any heterodyne or mixing process, but it certainly could not, and never is, the product of the two input signals. The fancy title is therefore misleading and to the newcomer gives a completely wrong idea of the circuit function. Forget the product and call the thing what it really is, a heterodyne detector or mixer and the radio experimenter immediately realizes that he is dealing with an old familiar friend, already in his receiver, and that every time he switches on the b.f.o. for c.w. reception he is using his existing diode to convert the two input signals to an audio frequency, and that it is then under those operating conditions, a heterodyne detector.

It is, surely, sheer nonsense and regrettable that a word meaning "a multiplication" is being used to describe circuits using mixer type valves such as the 6BE6, ECH81, ECF82 and 12AT7 used as heterodyne mixing detectors. Call these circuits by what they really are, and they are then seen to be—not a new breakthrough in the science of electronics but merely a further development of a known and existing system. The method is then accepted in the correct perspective and the technical myths do not arise.

It is further regrettable that manufacturers use the same misleading term and advertise that their latest XYZ receiver is equipped with a product detector. The truth is that the product detector has now become the latest gimmick for sideband reception so it *must* be offered to the prospective customer. A further example of this is the incorporation of another current gimmick, automatic voice control, more usually referred to as VOX; in fact many amateurs contemplating changing over to the s.s.b. method of working have the completely erroneous idea that a VOX system is an essential part of a single sideband transmitter. Automatic voice control is an interesting plaything and it impresses visitors, but the advantages of voice control are far outweighed by the additional components needed and the complications of the required control circuitry. Press to talk operation is completely simple and in practice most satisfactory. The amateur sitting in front of his s.s.b. transmitter and receiver is not flying a fighter aircraft—he can surely spare the use of his thumb or his foot to operate a press-button.

Single sideband in the amateur world is a relatively new technique and it is developing fast. It is, then, of particular importance to us all to eliminate the technical myths, the ballyhoo and the nonsense, and make quite sure that we are advancing forward and not, like Alice, using our valuable time and effort, only to find that after all, we have in fact stayed in the same place.

* *5 Janice Drive, Fulwood, Preston, Lancashire.*

RTTY

A quarterly review of Amateur Radio Teleprinting News and Views

By Dr. ARTHUR C. GEE (G2UK)*

ON a recent Sunday morning, the writer worked the following stations on RTTY on 80m: G3FHL in Ironbridge, Shropshire, G3NPF in Southend-on-Sea, PA0YG in the Hague, G2RF in Seascale, Cumberland, G3BST in Bletchley and G3CQE in Norwich. All these contacts were solid copy throughout. Readers will agree, no doubt, that this represents quite considerable activity and indicates the extent to which this mode of Amateur Radio communication is growing. For more than a year now, a regular sked has been held with PA0FB in the Hague at lunchtime on Wednesdays and copy is now absolutely solid on almost every occasion.

Besides this 80m activity, quite considerable RTTY activity is taking place on 2m, particularly in the Southampton area where the R.A.E.N. Group have been developing it. There is, of course, some DX activity, of which G3CQE is the chief exponent. So RTTY is now taking its place beside the other methods of radio communication currently used by the British amateur. It has quickly grown out of a purely experimental phase to enter that of a practical and reliable method of communication.

It is the purpose of this feature, which is to appear quarterly, to give members news of current happenings in the RTTY field and, as far as possible within the limited space available, to give some technical information about the system. Not very much has been published for the amateur in this country so far but the reader who is anxious to acquire knowledge is referred to the references appearing at the end of this article.

Teleprinting is a system in which the message is typed and appears in printed form at the receiving end. Attempts to produce machinery to do this date right back to the beginnings of electrical communication, but they were not successful until a Frenchman named Baudot realized that the main difficulty was that codes such as Morse's gave differing lengths of signal for various letters. " J " for instance is thirteen times as long as " E " when sent in Morse Code. Baudot introduced a code in which all the characters were of the same length, but are made up of differing groupings of impulses. The code now used for RTTY is known as the " International Telegraph Alphabet No. 2." It consists of groups of five impulses in various permutations. Amateur RTTY is not, therefore, high speed Morse code, as some still seem to think!

RTTY offers a number of very definite advantages as a system of communication. Of these, high speed of sending, more effective use of transmitted power than A3, freedom from certain types of QRM, narrow bandwidth and in many cases a greater freedom from TVI, no doubt appeal most to the radio amateur. The main difficulty with the system from the amateur point of view is the teleprinter, a complicated and costly piece of machinery. However, the radio amateur's undoubted flair for picking up things cheaply has stood him in good stead, and it is now possible to get quite suitable machines for £5 or so. Many radio amateurs, too, have an interest in things mechanical and the intricacies of the Creed Type 3 or 7 should not prove too disconcerting.

The way in which RTTY was introduced into the British Amateur Radio scene has been told often enough elsewhere. Since the summer of 1959, when a small group of enthusiasts started to investigate the possibility of getting this system started, much progress has been made. This group has now been expanded into the British Amateur Radio Teleprinting Group with a membership of over a hundred members and enjoys affiliation with the R.S.G.B. In conducting the affairs of this Group during the past eighteen months, the writer has met an enthusiasm amongst its members quite unlike anything since his earliest days in Amateur Radio.

So until next October then; those of you who are interested, read the literature referred to below and for those of you who are active RTTY types—good printing!

* *Honorary Secretary, British Amateur Radio Teleprinting Group.*

The photograph sent to G2UK by DLIGP of Flensburg to commemorate the first G/DL RTTY QSO. Besides activity in Holland, there is considerable interest in other European countries, particularly in Germany. DLIGP is encouraging activity in Switzerland and enquiries have also recently come from Norway for particulars of RTTY technicalities.

References

Elementary Telegraphy by E. Missen (Descriptions of teleprinters and their functioning).

Telegraphy by Freebody. The " classic " textbook on most aspects of teleprinting, teleprinters, etc.

Both the above books should be available from local Public Libraries.

The Radio Constructor. " Getting Started on RTTY." Vol. 13, November 1959 to April 1960 inclusive.

—— " RTTY in Theory and Practice." Vol. 13, May 1960 to Vol. 14, October 1960.

Short Wave Magazine. " A Converter for RTTY." March and April 1960, Vol. XVIII, Nos. 1 and 2.

The Radio Amateur's Handbook, Chapter 12.

Wireless World, " Amateur Teleprinting." April 1961.

Transistors in the House

LORD MORRISON of Lambeth—" My Lords, could the noble Earl tell us what a germanium transistor is?—because some of us here, being rather ignorant on these matters, do not know." The Earl of Dundee—" My Lords, I think that in order to get a thoroughly accurate definition the noble Lord should consult an electrician. The type which are on the embargo list include, for example, those using germanium as the bulk semi-conductor material and having the following characteristics: an average *f* alpha of less than 50 megacycles per second and designed to have a maximum collective dissipation (in watts) multiplied by the average *f* alpha (in megacycles per second) greater than 7·5." Lord Morrison of Lambeth—" My Lords, I am much obliged to the noble Earl. We are all quite clear about that." (Hansard, 6.4.60, quoted in the Bexley *Ratepayer and Resident* and reproduced in *North Kent Radio Society News Letter*, April 1961).

Society News

National Radio and Television Show

MEMBERS able to spare some time to help man the Society's stand at the National Radio and Television Show are invited to write to Mr. G. W. Norris (G3ICI), 134 Meads Lane, Ilford, Essex, stating the dates and times they will be available.

Offers of equipment for display are also invited and should be addressed to the Exhibition Committee at Headquarters.

The Radio Show at Earls Court, London, will be opened by Lord Boothby on August 23 and will be open daily until September 2. Colour television will be demonstrated by the B.B.C.

Affiliated Societies' Bulletin Subscriptions

THE Council have decided that Affiliated Societies who already receive one copy of the Society's Journal each month on payment of a special BULLETIN subscription of 10s. 6d. per annum may receive one additional copy each month on payment of a further annual sum of 12s. 6d. The affiliation fee remains unchanged at 10s. 6d. per annum.

Radio Amateurs' Examination and Morse Tests

THE G.P.O. is again arranging to conduct technical examinations and Morse tests for the Amateur (Sound) Licence this year, provided sufficient applications are forthcoming.

The technical examination will take place on Saturday, October 7, 1961, from 2 to 5 p.m., at the following centres:

Armour House, St. Martin's-le-Grand, London, E.C.1.

Radio Surveyor's Office, Ministry of Transport, 2 Bute Place, Cardiff.

Radio Surveyor's Office, Customs House, Dock Place, Leith, Edinburgh 6.

Written applications (no special form is required) to sit the examination accompanied by a remittance for the entrance fee of 25s., must reach the Radio Services Dept., Wireless Telegraphy Section, Union House, St. Martin's-le-Grand, London, E.C.1, **not later than September 2, 1961.**

Morse Tests will be held at the Head Post Offices in Birmingham, Cambridge, Derby, Leeds and Manchester during the first or second week in September, provided there are sufficient candidates. Application forms may be obtained from the Radio Services Dept., Radio Branch, Post Office Headquarters Building, St. Martin's-le-Grand, London, E.C.1. Completed application forms, to which the entrance fee of 10s. must be affixed in stamps, must be posted to the Radio Services Dept., Wireless Telegraphy Section, Union House, St. Martin's-le-Grand, London, E.C.1, **to arrive not later than August 19, 1961.**

* * *

Details of courses in preparation for the Radio Amateurs' Examination to be held in May 1962 will be published in the August issue of the R.S.G.B. BULLETIN. Organizers of such courses are invited to send information to Headquarters to arrive not later than July 22.

Bulletin Stencil Plates

IT occasionally happens that a stencil plate used for the preparation of a particular BULLETIN wrapper becomes worn or loses ink, with the result that the Post Office experience difficulty in tracing the address.

Members who notice that the address on the wrapper used for their copy of the BULLETIN is indistinct, or in any way faulty, are asked to advise Headquarters.

South-east Scotland O.R.M.

MORE than 50 members were present at the Official Regional Meeting held in the Carlton Hotel, Edinburgh, on Saturday, May 13, including some who had travelled from Glasgow, Lanark, Dundee, Fife, and the Borders. The Council was represented by the President, Major-General E. S. Cole, C.B., C.B.E. (G2EC), the Executive Vice-President and Zonal Representative, Mr. E. G. Ingram (GM6IZ) and the General Secretary, Mr. John Clarricoats, O.B.E. (G6CL).

At the business meeting in the afternoon, Mr. Clarricoats surveyed the Society's current activities and Major-General Cole and Mr. Ingram also addressed the meeting. The questions from members covered a wide range of topics.

After tea, the President gave the meeting a most interesting talk on present and future Army Telecommunications.

During the interval before dinner, there was a practical demonstration of Hallicrafters equipment which was kindly provided by James Scott & Co. (Electrical Engineers) Ltd.

At the dinner in the evening, the Rev. Walter Ferrier, B.D. (GM3BDA) proposed the toast of the Society, reminding us in passing that there was a " Ham " even in the Ark in Old Testament days and that Robert Burns in one of his poems mentioned visiting the local rigs (?) with his YL. The President replied on behalf of the Society.

In the forenoon, Mr. Ingram and the General Secretary visited George Watson's College and addressed a meeting of about 50 boys from schools in Edinburgh and the Lothians on the subject of Amateur Radio and the Society, after which they inspected the school " shack " to see the equipment at GM3BCD. The President was delayed on Army business and was unable to attend this meeting.

Correspondence With Headquarters

DURING the holiday season, it will be of considerable help to Headquarters in giving members speedy service if correspondence can be addressed impersonally to the General Secretary and Editor, rather than to individual members of the staff.

SOUTH WALES REGIONAL MEETING
PARK HOTEL, CARDIFF

Saturday, September 16, 1961

Programme:

2 p.m.	...	**Assemble**
2 p.m.	...	**Opening of Exhibitions**
2.15 p.m.	...	**Business Meeting**
5 p.m.	...	**High Tea**
6 p.m.	...	**Raffle**
6.15 p.m.	...	**Talk by the President**

The Council will be represented by the President, Major-General E. S. Cole, C.B., C.B.E. (G2EC), Mr. C. H. L. Edwards (G8TL) and Mr. A. C. Williams (GW5VX).

In addition to the Trade Exhibition, there will be an Exhibition and Competition for amateur-constructed equipment. Entries for the amateur-constructed equipment competition should be sent with the application for tickets, giving brief details of the entry.

Inclusive cost 15s., Ladies 10s.

Application for tickets should be sent, with the appropriate remittance, to Mr. D. C. J. Green (GW3MRI), 36 St. Augustine Road, Heath, Cardiff. Last date for reception of bookings September 9.

News Bulletin Jammer Fined

AT Aldridge Magistrates' Court on June 5, 1961, John Boyd Litherland of 68 Mill Road, Shelfield, Stafford, pleaded guilty to three charges of causing deliberate interference contrary to Section 13 of the Wireless Telegraphy Act 1949 and to a charge of using wireless telegraphy apparatus without a licence contrary to Section 1 of that Act. He was found guilty on all charges and was fined £25 on each of the three charges under Section 13 and £10 on the charge under Section 1. He was also ordered to pay £8 8s. costs and to forfeit all his apparatus.

Southern Counties Mobile Rally

THERE was an attendance of more than 600 at the Southern Counties Mobile Rally at Beaulieu Abbey, Hampshire, on May 28. About 155 mobiles, mostly on Top Band, were present. Members of the Hastings and District Amateur Radio Club travelled by coach complete with a whip on the rear bumper.

The Treasure Hunt was won by G5UJ, and the prizes for the best constructed Top Band and 2m rigs by G3ODR and G3FRV respectively. G3CUZ of Leek, Staffs., received a gallon of oil for the longest distance travelled to the Rally. The prizes were presented by Council Member Arthur Milne (G2MI). Other attractions included a childrens' treasure hunt and manufacturers' exhibits.

The holders of programmes numbered 0035, 0055, 0110, 0148, 0157, 0158 and 0251 may claim their prizes by sending their programme to L. H. Daish (G2FGD), 7 Bracken Lane, Shirley, Southampton.

The Rally was organized by the Southampton Area R.S.G.B. Group.

Harrogate Radio Amateur Wins Aerial Appeal

THE Ministry of Housing and Local Government has allowed the appeal of Mr. Eric Knowles (G2XK) of Harrogate against the refusal of the Harrogate Town Council to grant planning permission for a 38 ft. aerial mast. In his report, the Ministry's inspector said he was of the opinion that the hardship caused, if permission were refused, would outweigh any objection on amenity grounds.

Simplified Design Procedure for Pi-Network Tank Circuits

IN Example 2 on page 565 of the June 1961 issue of the BULLETIN, *C2* in step (c) should read 1425pF. Equation 8 in Appendix 2 on page 567 should read

$$Lr = R_2^2 C_2 / (1 + \omega R_2^2 C_2^2)$$

Uncle's Southend Party

THE Annual Southend " Do " organized by W. E. Nutton (G6NU) will be held this year on July 23. The rendezvous will be at 12 noon at the top entrance at the land end of the pier. All radio amateurs and their families will be most welcome.

Representation

MESSRS. J. C. Brown (G3DBO) and C. W. Davidson (GM3LAV) have resigned as representatives for the towns of East Ham and Edinburgh respectively.

Nominations for their successors should be made in the prescribed form and sent to reach the General Secretary by not later than August 15, 1961.

Can You Help?

● S. Haigh (A.2646), The Rectory, Wiston, Steyning, Sussex, who would like to hear from any member who has modified the RF24 unit to cover all bands from 10-160m with 465 kc/s output?

● C. R. S. Smith (B.R.S.18612), 19 Hyde Road, Kenilworth, Warks., who requires the handbook, circuit diagram or other information on the U.S. Navy Receiver type CNA46081?

Council Proceedings

Résumé of the Minutes of the Proceedings at a Meeting of the Council of the Radio Society of Great Britain, held at New Ruskin House, Little Russell Street, London, W.C.1, on Monday, May 29, 1961, at 6 p.m.

Present: The President (Major-General E. S. Cole in the Chair), Messrs. N. Caws, C. H. L. Edwards, K. E. S. Ellis, R. C. Hills, E. G. Ingram, J. D. Kay, A. O. Milne, L. E. Newnham, F. K. Parker, G. M. C. Stone, P. H. Wade, A. C. Williams, E. W. Yeomanson (Members of the Council) and Miss A. M. Gadsden (Assistant Secretary). Mr. J. A. Rouse attended during the discussion on the Handbook.

Apologies for absence were submitted on behalf of Mr. F. A. Russell, and Dr. R. L. Smith-Rose who was abroad.

Preamble

In opening the meeting the President explained that due to the absence through illness of the General Secretary, the Finance and Staff Committee had decided to ask Miss Gadsden to act as Minute Secretary. The Council concurred.

* * *

Membership

Resolved (i) to elect 125 Corporate and 53 Associates; (ii) to grant Corporate membership to 10 Associates who had applied for transfer; (iii) to approve the application of Mr. W. G. Bailey (G2CHI) for Life membership.

Application for Affiliation

Resolved to grant affiliation to the Manchester Grammar School Amateur Radio Club.

Amateur Radio Handbook

Consideration was given to a further Progress Report prepared by Mr. Rouse and to a report on the cost of producing the Handbook.

Resolved to accept the principle of allowing each member to order one copy at a reduced pre-publication price.

It was agreed that a voucher be inserted in all copies of the October 1961 issue of the BULLETIN sent to Home Corporates members inviting them to order a copy at the reduced rate.

The Council extended their thanks to Mr. Rouse for the great amount of work he had already done on the Handbook.

O.R.M.'s

(*a*) It was agreed that the President, Mr. Edwards and Mr. Williams should be the official representatives of the Council to attend the O.R.M. in Cardiff on September 16. It was agreed to authorize Mr. Parsons to organize a raffle in connection with the event.

(*b*) It was agreed to authorize Mr. Nicholson (Region 17 Representative) to hold an O.R.M. in Newbury, Berkshire, on Sunday, October 1, and to authorize him to organize a raffle.

Reports on O.R.M.'s

Reports on the Blackpool and Trentham Gardens O.R.M.'s were submitted by Messrs. Wade and Parker (the respective Zonal Representatives). A verbal report on the Edinburgh O.R.M. was given by Mr. Ingram (Zonal Representative).

A Guide to Amateur Radio

It was reported that an order had been placed for 5,000 copies of a revised edition of *A Guide to Amateur Radio*.

I.A.R.U. Calendar

Resolved to record an Aye vote in favour of an I.R.T.S. proposal relating to certificates and awards.

Lists of New Members

It was agreed to reconsider in six months' time a suggestion that lists of new members should again be published in the Society's Journal. (Lists of new members are sent to the R.R.s each month.—J. C.).

Reports of Committees

The Minutes of meetings of the following Committees were submitted as Reports:

Scientific Studies Committee, April 28, 1961; V.H.F. Committee, May 1, 1961; Exhibition Committee, May 5, 1961; TVI/BCI Committee, May 10, 1961.

Resolved (i) to receive the reports; (ii) to accept and adopt the various recommendations contained in the Reports.

The recommendations dealt with expenses claims in connection with those carrying out duty on the Society's stand at the Earls Court Radio Show and the reprinting of certain technical material on TVI which had appeared in the R.S.G.B. BULLETIN.

The meeting terminated at 9.50 p.m.

Receipts

RECEIPTS for subscriptions paid by cheque, bankers' order or postal order are not now issued unless specially requested. Receipts are drawn, however, and kept on file at Headquarters for six months.

PLEASE HELP US...

- *When writing to Headquarters do not include* BULLETIN *items, queries, changes of address and publication orders, etc., on the same sheet of paper. Only one envelope is necessary, but a separate sheet for each subject please.*
- *Always use block letters, or write clearly, your full name and address. Christian names, call-signs and illegible signatures cause much unnecessary checking.*
- *Notify Headquarters of impending changes of address several weeks before you move. Alterations to subscription reminders, etc., are not sufficient unless definite instructions are given. Include your B.R.S. number and/or call-sign, your present address and, if possible, the date your subscription falls due. Remember that* BULLETIN *wrappers are prepared up to three weeks before the publication date.*
- *When forwarding your subscription please return the reminder card sent to you from Headquarters, or, if this has been lost, indicate the date your subscription fell due.*

...TO HELP YOU!

R.S.G.B. Tape Recorded Lecture Library

APPLICATIONS from R.S.G.B. Groups, Affiliated Societies and Clubs, to borrow tape recorded lectures should be sent to the Hon. Librarian, Mr. N. C. Ta'Bois (G3HWG), 81 Snakes Lane, Woodford Green, Essex, as far in advance as possible. A list of the recordings available may be obtained from Headquarters.

Mr. F. C. Judd, A.Inst.E. (G2BCX) has prepared two tapes which are available for loan. The first "Electronic Music and Musique Concrete" (5 in. spool, 3¾ i.p.s., 70 minutes), describes and illustrates the methods of producing these modern forms of music. The second tape, "Experiment in Sound" (3 in. spool, 3¾ i.p.s., 15 minutes), is a short excerpt from the first tape and is intended as a "fill-up" by clubs borrowing one of the shorter tapes from the Library.

There is no demand for "V.H.F./U.H.F. Convention 1957" and this tape has now been withdrawn from the Library.

GB2RS SCHEDULE

R.S.G.B. News Bulletins are transmitted on Sundays in accordance with the following schedule:

Frequency	Time	Location of Station
3600 kc/s	9.30 a.m.	South East England
	10 a.m.	Severn Area
	10.30 a.m.	North Midlands
	11 a.m.	North East England
	11.30 a.m.	South West Scotland
	12.00	North East Scotland
145·55 Mc/s	11.15 a.m.	Beaming south-east from Leeds
	11.30 a.m.	Beaming south-west from Leeds
	11.45 a.m.	Beaming north from Leeds
145·3—145·4 Mc/s	12 noon	Beaming north from South East England
	12.15 p.m.	Beaming west from South East England

News items for inclusion in the bulletins should reach Headquarters not later than first post on the Thursday preceding transmission. Reports from Affiliated Societies and from non-affiliated societies in process of formation will be welcome.

CONTEST NEWS

RESULTS — REPORTS — RULES

First 1·8 Mc/s Contest 1961

AFTER running second in the last two events and first in the second 1959 event, H. J. M. Box (G6BQ) came first in the 1·8 Mc/s Contest held on February 25-26. Only three points behind was W. A. Higgins (G8GF) who had not entered for at least five years. With G3BMY absent on this occasion there has been quite a reshuffle at the top.

Conditions were generally reported as good with much DX heard. G6BQ took a few minutes off to work K2DGT but there were no other reports of transatlantic stations being worked during the contest though several stations, including ZC4AK, reported hearing them. Europeans worked included DJ2KS, EI8J, HB9QA and many OKs. A very interesting check log was received from OK1KPR who worked a total of 76 stations worth 220 points.

W. Robertson (GM6RI) had the highest aggregate score for a Scottish station taken with the November 1960 event and therefore wins the Maitland Trophy.

Thanks are due to G2BP, G3IQG, G3JLE, G3KRC, G3KYU, G3LLM, G3MBS, G3NHU, G3ONR, G4VF, G6ZT, HB9AQ, OK1KPA, OK1KPR, OK1OO, and A.2122 for their check logs.

FIRST 1·8 Mc/s CONTEST 1961

Posn.	Call-sign	Points	Posn.	Call-sign	Points
1	G6BQ	172	26	G2BOF	84
2	G8GF	169	27	GI3KYP	83
3	G3KLH	153	28	G3OOU	82
4	G3MXJ	151		G3LFS	82
5	G3FYE/A	146	29	G3JRL	78
6	G3NFV	137		G2CUZ	78
7	G3ERN	129	30	G2ZZ	77
8	G3JJZ	125	31	G2XP	76
9	G5LR	124	32	G3HIW	75
10	GW3NAM	122	33	G3NVC	74
	G3KVG	122	34	G3KTF	73
	G3FM	122	35	GM2HIK	72
11	G3IGW	118	36	G3NBL	69
12	G3IAS	108	37	G3FVW	68
13	G3KOR	105	38	G3JWB	66
14	G3LHJ	103	39	GW3GHC	65
	G3GNS	103	40	GI3LZS/A	61
	G8FC	103	41	G3MEP	59
15	G3IPG	100	42	G3HWS/A	58
	G3MJ	100		G3KHT	58
16	G3BTU	99	43	G3OJI	50
	G3DCZ	99		G3CWW	50
17	G3NPI	97	44	G8KU	44
18	G3NYZ	94	45	GW3CBY	42
19	GM6RI	93	46	G3KWH	41
20	G3ORH	92		G2ZR	41
*	G3OIT	90	47	G3MGL	38
22	G3LVP	88	48	G3JXZ	36
23	GM3KHH	87		G3KUG	36
	G3KKQ/A	87	49	G3LAP/A	32
24	G3NXQ	86	50	G6OO	31
	G3KLT	86	51	G2DHV	24
25	G3BIK	85			
	G3JKY	85			

* Late entry.

MAITLAND TROPHY

Posn.	Call-sign	Nov. 1960	Feb. 1961	Total
1	GM6RI	88	93	181
2	GM3KHH	88	87	175
3	GM2HIK	76	72	148
4	GM3AXX	37	—	37

Listeners' V.H.F. Contest 1961

THE first listeners' contest ever organized by the Society and held on March 4-5, 1961, in conjunction with the 144 Mc/s Open Contest must be considered a mixed success. An entry of nine is rather disappointing, particularly only one entry from a licensed amateur, although the rules specifically allowed for entries from licensed operators who do not possess transmitting gear for the 2m band. However, those who did enter returned creditable scores and it is to be hoped that future listener contests will receive the support they need to preserve their place in the calendar of events.

The winner was A. W. Blandford (B.R.S.18572), who is an old hand at 2m listening, from his QTH in Mitcham, Surrey. He used an E88CC cascode converter and a 4-over-4 slot fed Yagi. The runner-up was A. J. Baker (A.1710) who operated *portable* from a site near Blandford Forum, Dorset, using a cascode converter and a 6-over-6 slot beam.

Posn.	Entrant	Counties Heard	Points
1	B.R.S.18572	31	2435
2	A.1710/P	29	1770
3	B.R.S.20044	32	1720
4	B.R.S.15822	21	1385
5	A.2524	28	1340
6	B.R.S.22445	16	1180
7	B.R.S.22550	21	1005
8	B.R.S.13336	13	885
9	G3IGW	17	875

Low Power Contest 1961

AFTER a serious slump in the number of entrants over the last two years it is pleasing to note an upward trend again in this once popular contest, held on April 8-9, 1961. V. H. Curling (G6VC), who won for the second successive year with 2,160 points, must have noticed the approach of a new challenger in R. N. Graham (GW3OAY) who, with his first entry, gained 2,100 points and second place. These two stations lead the field by the tremendous margin of more than 700 points, J. R. Petty (G4JW) taking third position with 1,380.

Among the comments from competitors was a request for descriptions of the types of equipment used over recent years. This would be a virtual impossibility and are so varied this year to preclude a full list. Suffice to say that G6VC used 6AC7 v.f.o., 6AC7 p.a. rig running 0·5 watts to a half-wave dipole 45 ft. high while GW3OAY had a modified T.C.S. transmitter (v.f.o./b.a./p.a.) feeding a G8KW dipole.

Conditions were good on the first day but deteriorated on the next with high noise level, and QRN seriously affected several stations. Despite this, over two dozen continental contacts were completed. The contest appears to have been generally enjoyable.

It is proposed to make the 1962 contest an all-transistor event which should add considerable interest.

Posn.	Call-sign	Points	Contacts	County Areas	Power
1	G6VC	2160	77	31	0·5 watts
2	GW3OAY	2100	70	35	0·49 watts
3	G4JW	1380	43	26	0·468 watts
4	G5VU	1315	42	24	0·5 watts
5	GC2CNC	1310	44	22	0·45 watts
6	G3NEO	1121	36	21	0·5-5·0 watts
7	G5LQ	1060	34	19	0·5 watts
8	G3CWL	815	25	16	0·4-0·48 watts
9	G2BOF	750	36	20	1·0-2·0 watts
10	G2BHN	675	19	15	0·45 watts
11	G3GXO	360	11	7	0·5 watts
12	G2DHV	190	15	9	5·0 watts
13	G3CGD	160	4	4	0·5 watts
14	G3KHT	85	4	3	0·75-1·05 watts

First 420 Mc/s Open Contest 1961

" CONDITIONS must surely have been an all time low but I honestly believe enthusiasm was all time high "—so wrote G. A. Jeapes (G2XV), who leads in this year's contest, as he did in the last. The number of contestants was really excellent as compared with the same event last year, but the extra number just about equals the increased number of stations

heard. In all, 67 stations were worked—last year there were about 50 active. The best DX was just over 90 miles compared with 120 miles on that occasion.

Interest in 420 Mc/s is gradually spreading—there was a little pocket of activity in the Cheshire area, others near Bristol and around Birmingham, where they had difficulty in breaking into the other, the largest pocket, in London and the Southern area.

Generally speaking, contacts were well within a 50 mile radius of the contestant although G3NNG worked G2XV (75 miles) with 5 watts to a 6-over-6 slot beam aerial—the latter used 90 watts and a 40 element stack, for practically the same readability at both ends.

The competitors certainly want some understanding: the Contests Committee specifically asked for " location as transmitted " to be recorded but very few complied, although

Posn.	Call-sign	Points	Posn.	Call-sign	Points
1	G2XV	930	13	G3LHA/A	456
2	G3JWQ/P	902	14	G2HDJ	442
3	G3JMA	722	15	G5NF	433
4	G8AL	708	16	G3KFD	357
5	G3NNG	685	17	G2CIW	326
6	G3KBS/P	668	18	G3FEX	307
7	G3NOX/T	664	19	GW3ATM/P	282
8	G3LTF	623	20	G3HAZ	274
9	G2RD	596	21	G6XA	264
10	G3FP	574	22	G3KPT	261
11	G2FNW	495	23	G5DF	223
12	G3BA	468	24	G3BAK	105

they could have been disqualified on that point. The N.G.R. rule received much better attention and the information helped enormously in checking distances, As an example: Birmingham (if given as a QTH) could mean either end of a city at least 10 miles across. The " location " rule was designed to help eliminate those who rely on the *Call Book* for the QTH and also as a check upon accuracy of the N.G.R. which, on some occasions in the past, has been severely garbled in transmission.

A check log from G3MI is gratefully acknowledged.

Oxford D/F Event

ELEVEN competitors took part in the Oxford D/F Qualifying Event, organized by Oxford and District Amateur Radio Society and held on June 18, 1961.

D. G. Alexander (G3KLH) of Oxford was first to locate the hidden transmitter at 14.42, followed by E. L. Mollart (B.R.S.10977), also of Oxford, half a minute later, C. N. Smart of the Slade Radio Society at 15.02 and G. T. Peck (B.R.S.15902) of High Wycombe at 15.09.

In all, nine competitors succeeded in finding the transmitter. Later, tea was served at the " Barley Mow."

Surrey Two Metre D/F Hunt

ON September 24, 1961, the Surrey Radio Contact Club is to hold a 2m D/F Hunt and Rally in the Surrey/North Sussex border area. The event will be open to all interested.

The contest will commence at 2 p.m. with the last transmission at 4.30 p.m. There will be an entrance fee of 2s. 6d. to cover the cost of prizes.

Prospective entrants may obtain further details from S. A. Morley (G3FWR), 22 Old Farleigh Road, Selsdon, South Croydon.

When writing to the Author of an article published in the BULLETIN please enclose a stamped addressed envelope for reply.

Action against Radio and Television Interference in Belgium

ALL new television receivers sold in Belgium must now be equipped with an anti-interference device designed to prevent interference to long and medium wave sound broadcasts. Belgium car drivers will have to equip their cars with an anti-interference system by June 24, 1961, to protect the reception of television programmes. (From *I.T.U. Telecommunication Journal*, April 1961.)

Mr. H. V. Griffiths, M.B.E. (ex-G6FF)

IT IS with deep regret that we record the sudden death on June 28, 1961, of Mr. H. V. Griffiths, Engineer-in-Charge of the B.B.C. Monitoring Station at Tatsfield, Kent. Mr. Griffiths held an amateur licence for many years and took an active interest in the recent installation of the Society's Beacon Station GB3VHF at Wrotham. His father, the well-known entertainer Joss Alexander, was the original holder of the call-sign G2GF.

Silent Keys

FRANK FORBES (ex-2BFC)

It is our sad duty to record the death on June 2, 1961, of Frank Forbes (ex-2BFC). Frank was crippled as the result of a childhood accident and survived repeated operations with never a word of complaint, but was always cheerful and willing. His long bouts of illness after the war resulted in his being unable to fulfil his ambition of obtaining the coveted " G " to his licence, but assisted by his friends he had taken the May R.A.E. and passed successfully.

He will be remembered for his many contributions to the wartime BULLETINS on modifications to the HRO receiver to permit d.c. and universal mains working. He worked with the Admiralty during the war and afterwards with Mullard Ltd.

The funeral took place at Croydon crematorium. Floral tributes were received from the Directors and Component Division of Mullard Ltd. The Society was represented by Messrs. G. F. Weller (G3DNJ) and F. R. Scott (G2CZH).

The sympathies of his many friends are extended to Mrs. Forbes and her two sons.

F. R. S.

S. S. JEFFS (G3PR)

The death on May 23, 1961, of Samuel Slater Jeffs (G3PR) robbed Birmingham of one of its best known radio amateurs. First licensed in 1938 Sam had been active on all bands from 160 to 10m.

Always ready to help the beginner with advice and Morse (at which he was no mean exponent) he endeared himself to many younger amateurs as well as old timers. His cheery voice and air of banter hid the struggle he was having for the last ten years against failing sight.

When he was eventually forced by blindness to retire prematurely, Amateur Radio was his salvation, enabling him to keep in touch with his many friends at home and abroad. He was a keen DX man.

The funeral at Yardley Crematorium was attended by more than a dozen local amateurs, paying their last respects to an old friend and a likeable character.

To his two daughters and son-in-law we extend our sympathy.

ERNEST WILL ROGERS (G2AMN)

It is with great sorrow that we record the death of " Nick " Rogers (G2AMN) on June 13, 1961, in his 56th year. " Nick " had suffered from heart trouble for several years but his sudden passing was a tremendous shock to his many friends.

Mr. Rogers was the Chief Inspector of Schools for Staffordshire and had done a great deal to encourage teachers interested in Amateur Radio.

G2AMN was Deputy County Controller for R.A.E.N. and in addition to his R.S.G.B. membership, was a keen supporter of the Cannock Chase and Stoke-on-Trent Amateur Radio Societies.

Nick was active on all the bands 160-10m. Many members will remember that G2AMN in Stone was the Southern Control Station for the recent Trentham Gardens Mobile Rally. He was relicensed as G2AMN in April, 1958, having held an experimental licence as early as 1923.

The funeral service and cremation took place at Carmontside Crematorium, Stoke, on June 15, Messrs. J. Bell (G3DII), J. E. Wagg (G3DKC), and B. M. Poole (G3JAZ) represented the amateur fraternity.

To his wife, son and daughter we extend our heartfelt sympathy.

C. J. M.

Letters to the Editor . . .

Neither the Editor nor the Council of the Radio Society of Great Britain can accept responsibility for views expressed by correspondents. Letters for inclusion in this feature should be concise and preferably not more than 200 words in length.

Cliffe Metcalfe Memorial

DEAR SIR,—It is now nearly six months since the death of Mr. Cliffe Metcalfe (G3DQ), Past President of the Radio Society of Great Britain.

Mr. Metcalfe had a special place in the affections of Lincoln Short Wave Club; he visited our last Hamfest and Mobile Rally and mingled with the members as a friend. But this is by no means the only reason that we feel that some lasting tribute to his memory should be made, and it has been suggested that other clubs in the North of England might wish to join us in contributing to such a project.

We feel that the creation of yet another trophy is of little worth for the future of Amateur Radio—it becomes just another dust collector on the shelf of some expert—and the club members of Lincoln would like to see some memorial which would bear fruit in the rising generation of radio amateurs.

The possibilities are quite numerous and offers of help and suggestions would be appreciated from any Northern club or individual Society member. It has been suggested that an R.A.E. Correspondence Course could be provided annually for someone unable to attend such a course by virtue of condition or location. Another idea put forward is that an annual award be given for the amateur licensed within the last 12 months with the highest score in B.E.R.U. Both these ideas would be aimed at encouraging the young amateur and short wave listener and we feel that this is an aspect which would have met with the whole-hearted approval of G3DQ.

Through the pages of the Society's magazine we ask anyone who feels as we do to write to us and help to make our ideas into reality.

Yours faithfully,
F. C. LATHWOOD (G3MUL),
Hon. Secretary.
Rochmount,
10 Sturton Road,
Saxilby, Lincoln.
(Mrs.) F. E. WOOLLEY (G3LWY),
Assistant Hon. Secretary,
Lincoln Short Wave Club.

Operating Practices

DEAR SIR,—There have been sporadic outbreaks in your correspondence columns on the respective merits of code and phone operation, and the R.S.G.B. seems to have done little in the past to discourage the use of phone. Accordingly I was very glad to see the lead taken in your editorial in the current issue. This attack on the selfish attitude of phone users in our bands although belated, may be timely if acted upon.

Apart from its use by handicapped amateurs (and I am prepared to support any mode of transmission on their behalf) I can see no justification for the use of any form of phone on the h.f. bands. The manner in which it is being used (so ably attacked in your leader) and the endless repetition of banal remarks cause it to occupy band space which could be put to better use. But if real justification were needed for excluding phone from the h.f. bands then the crowded state is ample. If it be assumed that any form of phone occupies at least 2 kc/s then clearly seven c.w. stations might be accommodated with a receiver pass-band of 300 c/s.

Let the R.S.G.B. follow up its well merited admonition by insisting that its members use c.w. only on the h.f. bands, and use the whole of the bands; and that those members who are keen to use phone should transfer their activities to 2m (the ideal band for nets and natters so ably pioneered in that respect by G5UM and others) where the available band width is more than 80, 40, 20 and 15 put together.

Yours faithfully,
Potters Bar, Middlesex. D. C. D. CAVE (G2FMJ).

(The remarks in *Current Comment* in the June issue of the BULLETIN were not intended to be an attack on the use of phone but on those few operators, whatever mode they use, who fail to observe reasonable courtesy on the air.—EDITOR).

DEAR SIR,—In *Current Comment* (June issue), I was glad to see you quote the A.R.R.L.'s Amateur Code:

" He never knowingly uses the air for his own amusement in such a way as to lessen the pleasure of others."

The contest calendar for the autumn and winter seems to show that the contest organizers do not agree with this code.

Almost every weekend is taken up with a contest. Only a minority enjoy contests but they are clearly determined " knowingly to use the air for their own amusement in such a way as to lessen the pleasure of all those who do not wish to go in for contests."

Unless the organizers co-operate to have fewer contests by combining to have, say, one for each continent only, or to restrict their activities to a small portion of the band, the rest of us will regard the " Amateur Code " as pure hypocrisy.

Yours faithfully,
London, N.W.3. E. M. WAGNER (G3BID).

Band Planning and Net Working on " Two "

DEAR SIR,—Once again the BULLETIN pulls away far ahead of any contemporary Amateur Radio journal in the freedom of debate it allows in its columns, this time on Two Metre Band Planning and Two Metre Net Operation.

Of the many comments appearing in the June issue on these related subjects that of G3OHD (Petts Wood) seems quite the most balanced and sensible. In observing that the present Two Metre Band Plan is heavily loaded in favour of the DX man he voices a point of view that seems to be widely shared. His suggestion to segregate DX operation in the middle 1 Mc/s, band planned as now, with local operation in the two outer 500 kc/s sections, is worth serious thought. But it poses one awkward problem: crystals! Operators who have already laid out good money on new crystals to conform with the " inside-out " switching of the previous Band Plan may well be reluctant to expend any more, as G3BW so rightly says. Buying cheap surplus crystals is out so far as the lower position of the band is concerned: they all drop on forbidden frequencies!

This fact of life is rather glossed over by G3HBW when he says " there can be no objection to using the lower shared megacycle provided that the Service spot frequencies are avoided." There can—and it's a financial one! Incidentally, the field strength measurements quoted by G3HBW are presumably all taken using a fixed beam heading. These figures are valid for signals coming from one direction. Turn the beam and the " strong local signal " should be many times down.

What is alarming about the comments of several correspondents is the apparent assumption that " Two " is intended for DX only. This state of mind confirms the common belief that the so-called " big boys " come on the band only when DX is assured. Comments on this attitude heard on the air in the Home Counties include:

" Those who want DX made easy should transfer to 160m, which is a more natural c.w. band than Two," and . . .

" It is quite unreasonable to freeze large slices of ' Two ' for the occasional pleasure of a handful of DX men when these frequencies could be more usefully and consistently employed for regional contacts, and for Town Group meetings on the air away from the QRM caused by the big boys."

Finally, may one be allowed a comment of one's own on the crack by G3BW that nets are little better than Mother's Union meetings? One assumes that he is basing his remark on what goes on in the h.f. bands, and has never had the opportunity, through the remoteness of his location, of hearing how efficiently contemporary 2m nets can in fact be conducted. He would have a pleasant surprise if he did.

Yours faithfully,
Bull's Green, Knebworth, JACK HUM (G5UM).
Hertfordshire.

Amateur Radio—A Service to the Community

DEAR SIR,—Mr. E. Arnold Matthews' (G3FZW) reasons (November 1960 BULLETIN) for turning down third party messages would be most commendable, were it not for the fact that Amateur Radio, unlike some types of television is not a " closed circuit." There are many who, like G3FZW, wish to keep the old amateur spirit, and the flame of the pioneers, aglow, but unfortunately we live in a constantly changing world which said goodbye to large brass terminals and ebonite panels long

ago. As amateurs we have on one hand, the public, who as we grow in number will become increasingly aware of our presence, and who will judge us as they find us, and on the other hand we have our licensing authorities who put into effect international telecommunication agreements.

If we examine our r.f. allocations over the past 15 years we shall see that in Region I we have lost fractions from most bands and, unless halted, this nibbling-away will continue, as we are pressed further and further up to the v.h.f.'s. We cannot halt this process entirely—which is progress—but we must seek to retain what is ours and that retention will only be strengthened by merit. There is growing in Amateur Radio circles a saying that "Amateur Radio exists as a hobby because of the service it renders." Service can be interpreted in many ways but one is service to one's fellows, and if that can be added to our present achievements then it puts one more trump card in the hands of our negotiators. We simply must have strong reasons for our existence and the stronger we can defend ourselves then the better chance we shall have of withstanding further intrusion into our holdings. Surely one of the strongest reasons we could ever have would be that we are a valuable service to the community. We cannot expect Amateur Radio to exist for ever as a hobby—static, inviolate and preserved. Whilst we still contribute something to the advancement of h.f. communication there lies before us the possibility of being a service in action as well as by description, when next we defend our faith in amateur communications. Our frequency holdings must be guarded with all our strength, and here, surely, is merit, the merit of service to others.

Mr. Matthews is well aware of the increase in stature gained by Amateur Radio since the inception of R.A.E.N. and knows well how the esteem of a hobby can grow when that hobby, whilst still retaining its individuality, takes upon itself some responsibility such as emergency communications. Indeed it is to be hoped that as time goes by Amateur Radio may assist more than at present in its liaison with, particularly, Civil Defence and the Police. But what Amateur Radio has done for the emergency services it could do for the public, and so would further its own growth, attracting members not only by a love of electronics, but also by a desire to be associated with an organization which helped one's fellows. Amateur Radio could grow into a well-known and well-esteemed service and so ultimately our existence would be secured, not only by our own valuation but by that of so many more who would have had reason to know of an amateur's service to his neighbour.

No one will believe that any amateur will ever be lacking in conversational ability. No, Mr. Matthews, it's a much deeper reason than that—it touches upon our very existence.

Yours faithfully,

Middlesborough, Yorks. ALLAN L. TAYLOR (G3JMO).

S.S.B. versus A.M.

DEAR SIR,—For some time now I have followed the arguments about the relative effectiveness of s.s.b. compared with a.m. and have been amused sometimes by the calculations some members have produced to prove that s.s.b. has anything from 3 to 17db improvement over a.m.

During this period I have changed to s.s.b. and there is no doubt in my mind that it is superior to any other telephony system. This conclusion has been reached simply by comparing the relative ease with which I can now work DX with the fight I used to have before, using similar power and the same aerials.

Mr. Leal (G3ISX), referring to s.s.b. signals in the March BULLETIN, states that, "Most of them seem to be a cross between Donald Duck and the bath water running away." This is the kind of remark one often hears made by people who either cannot, or will not, tune in a sideband signal properly. I do not think that Mr. Leal's comment will be taken too seriously since, if one takes the trouble to tune carefully over the 20m band with a suitable receiver, it will be found that most of the s.s.b. signals are quite good. It is all too easy to hear one bad signal—and I admit that there are some real stinkers, just as there are a.m. signals—and to condemn the system as a whole.

Although a somewhat fiddly business, it is quite possible to do justice to the majority of s.s.b. signals with an older type of receiver set up for c.w. reception provided that the r.f. gain control is properly adjusted. However, unless the b.f.o. injection voltage is considerably increased, it is difficult to receive a very strong s.s.b. signal in this way; but this is no fault of the transmitter.

I fail to see how anyone can suggest that a system which radiates two sidebands saying exactly the same thing, plus a carrier which conveys no intelligence whatsoever and can only contribute to heterodyne interference, could possibly be more efficient than s.s.b. If anyone has such an argument, I am sure we would all like to hear it.

Whilst agreeing with Mr. Leal that some s.s.b. operators, especially those using the 80m band, are lax about call-sign procedure. I would point out that with snappy, voice operated break-in, a lot of information can be conveyed in a few minutes which might give the impression of a long period without identification.

Finally, may I request that we now bury this unnecessary controversy. The various forms of amateur transmission will always have their devotees and arguments on paper will not alter this state of affairs. In my case, the change to s.s.b. was made because it seemed to offer a more reliable, efficient and less selfish form of telephony, permitting more economic use of our limited allocations. In practice, I have found this to be the case and have no doubt that, as reliable, reasonably priced s.s.b. exciters become available, the figure of 9 per cent using s.s.b. will quickly increase.

Yours faithfully,

London, E.10. NORMAN A. S. FITCH (G3FPK)

Single Sideband—Facts Wanted

DEAR SIR,—Recent letters and articles in the BULLETIN tend to leave one more confused than ever about the relative advantages and disadvantages of single sideband transmission. It is a pity that no mathematically minded member has come forward with a good analysis of the various methods.

However, there is at least one indisputable fact. For any given signal-to-noise ratio, under ideal propagation conditions and in the presence of broadband noise, A3 and A3a transmissions perform equally when the total sideband power of the two transmitters is equal. In other words, this means that a 150 watt A3 transmitter will provide the same signal intelligibility as a 75 watt A3a transmitter. This fact takes account of the necessity to use double the bandwidth for A3. From the above, two simple advantages arise for sideband: (*a*) It requires only half the bandwidth; (*b*) It requires a smaller p.a. valve.

The second advantage can be expanded further. According to the book a 150 watt A3 transmitter will require a valve of 75 watts anode dissipation if it is not to be over run. For the same anode efficiency the 75 watt A3a transmitter will only require a valve of 25 watts anode dissipation. The matter does not end here. Since no carrier is transmitted with A3a and speech power is normally taken as being half of pure tone power, it is reasonable to expect that a valve of 12½ watts dissipation could be used if the operator refrains from whistling. This is a substantial saving, when compared with A3, especially when the absence of the large modulator and its power pack is taken into account.

I am open to challenge on any of the above, but please could it be a mathematical one. Incidentally it should be obvious that to halve the selectivity in the receiver on an A3 transmission will merely degrade the signal-to-noise ratio, although there may be other advantages.

Yours faithfully,

A. J. R. PEGLER, Commander,
Royal Navy, A.M.I.Mech.E.,
A.F.R.Ae.S. (G3ENI).

Bedhampton,
Hants.

New U.S. Publications

UNDERSTANDING MICROWAVES. Abridged reprint by V. J. Young, Ph.D. 304 pages. Price $3.50.

HOW TO USE METERS, by Rider and Prensky. 216 pages. Price $3.50.

RADIO CONTROL FOR MODEL BUILDERS, by Willan Winter. 228 pages. Price $4.25.

HOW TO USE GRID DIP OSCILLATORS, by R. P. Turner. 112 pages. Price $2.50.

MOON BASE, by T. C. Helvey. 80 pages. Price $1.95.

All of the above are published by John F. Rider, Inc., 116 West 14 Street, New York, N.Y.

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Forthcoming Events

Details for inclusion in this feature should be sent to the appropriate Regional Representatives by the 18th of the month preceding publication. T.R.s and club secretaries are reminded that the information submitted must include the date, time and venue of the meeting and, whenever possible, details of the lecture or other event being arranged. Regional Representatives are requested to set out the copy, preferably typed double spaced, in the style used below. Standing instructions for more than three months ahead cannot be accepted.

DATES FOR YOUR DIARY

August 12-13.—Derby Mobile Rally and Hamfest.
August 23-September 2.—National Radio and Television Show, London.
August 27.—Stamford Rally Fest at Burghley Park, near Stamford.
September 3.—G6UT's "Ham Party."
September 10.—National Mobile Rally at Woburn Abbey.
September 10.—Region 14 O.R.M.
September 16.—Region 10 O.R.M. at Cardiff.
September 17.—Lincoln Mobile Rally and Hamfest.
October 1.—Region 17 O.R.M. at Newbury.
October 8.—Region 6 O.R.M. at Cheltenham.
October 21-22.—Scout Jamboree-on-the-Air.
November 22-25.—R.S.G.B. International Radio Hobbies Exhibition, London.
December 16—A.G.M., London.

REGION 1

Ainsdale (A.R.C.).—Wednesdays, 8 p.m., 37 Hawthorne Grove, Southport.
Blackburn.—Fridays, 8 p.m., West View Hotel, Revidge Road.
Blackpool (B. & F.A.R.S.).—Tuesdays, 8 p.m., Squires Gate Holiday Camp.
Bury (B.R.S.).—August 8 (R.S.G.B. Recorded Lecture), 8 p.m., Knowlsey Hotel, Kay Gardens.
Chester.—Tuesdays, 8 p.m., Y.M.C.A.
Liverpool (L. & D.A.R.S.).—Tuesdays, 8 p.m., Gladstone Mission Hall, Queens Drive, Stoneycroft.
Macclesfield.—July 25, Ausust 8, 22. 42 Jordongate.
Manchester (M. & D.A.R.S.).—Wednesdays, 7.30 p.m., King George VI Club, North Road, Moston, Manchester, 10. **(S.M.R.C.).**—Fridays, 7.30 p.m., Fallowfield Bowling and Lawn Tennis Club, 81 Wellington Road, Fallowfield 14.
Morecambe.—August 2, 125 Regent Road.
Preston.—August 8, 22, St. Paul's School, Pole Street.
Southport (S.R.S.).—Thursdays, 8 p.m., The Esplanade.
Stockport (S.R.S.).—July 19 ("Transistors" by I. MacArthur, G3NUQ), August 2, 16, 30, 8 p.m., The Blossoms Hotel, Buxton Road.
Wirral (W.A.R.S.).—July 19, August 2, 16, 7.45 p.m., 15 Balls Road, Claughton, Birkenhead.

REGION 2

Bradford (B.R.S.).—July 25 ("Audio Amplifier Design and Construction," P. J. Barowitz, G3LZW), August 15 (Informal), 7.30 p.m., Cambridge House, 66 Little Horton Lane, Bradford 5.
Halifax (H. & D.R.S.).—August 1 (Display of Members' Gear), August 15 ("High Ball" QSO, visitors from other Clubs), 7.30 p.m., Beehive & Crosskeys Inn. **(Northern Heights A.R.C.).**—August 9 (Discussion on Scout Jamboree on the Air), August 23 (Ragchew), September 6 ("Radio Astronomy" by Mr. Doughty), Candy Cabin, Ogden.
Scarborough (S.A.R.S.).—Thursdays, 7.30 p.m., Chapman's Yard, North Street, Scarborough.
Sheffield (S.A.R.C.).—Second Wednesday in each month, Dog and Partridge Hotel, Tippett Lane, Sheffield 1.

REGION 3

Birmingham (South).—July 20, 7.30 p.m., Friends Institute, 220 Moseley Road, Birmingham 12. **(Slade).**—July 21, August 4, 7.45 p.m., The Church House, High Street, Erdington. **(M.A.R.S.).**—July 18 ("More S.s.b. Tropics," by G. Brown, G5BJ), 7.30 p.m., Birmingham and Midland Institute, Paradise Street.
Coventry (C.A.R.S.).—Mondays, 7.30 p.m., R.A.F.A. Club, Holyhead Road.
Stourbridge.—August 1 (Tape Lecture), 7.45 p.m., Foley College, Stourbridge.
Wolverhampton.—July 17 (2m Construction Class), July 31, August 14, 8 p.m., Neachells Cottage, Stockwell End, Tettenhall.

REGION 4

Derby (D. & D.A.R.S.).—July 16 (Derby v. Burton-upon-Trent D/F Challenge), July 19 (Local Visit), July 26, August 2, August 5 (Fifty Years of Radio Exhibition), August 12 (Hamfest), August 13 (Mobile Rally), 7.30 p.m., Room No. 4, 119 Green Lane, Derby. **(D.S.W. Exp. Soc.).**—Fridays, 7.30 p.m., Sundays, 10.30 a.m., Nunsfield House, Boulton Lane, Alvaston.
Grantham (G. & D.A.R.S.).—Mondays, 7.30 p.m., Club Room (rear of Manners Arms), London Road, Grantham.
Grimsby (A R.S.).—Alternate Thursdays, 8 p.m., R.A.F.A. Headquarters, Abbey Drive West, Grimsby.
Leicester (L.R.S.).—Mondays, 7.30 p.m. (Morse Tuition, 7.30-8.30 p.m.), Club Rooms, Old Hall Farm, Braunstone Lane, Leicester.
Nottingham (A.R.C.N.).—Tuesday and Thursday, 7.30 p.m., Community Centre, Woodthorpe House, Mansfield Road, Sherwood, Nottingham.
Newark (Magnus G.S.).—July 18 ("Amateur Radio" by F. C. Ward, G2CVV), 2.30 p.m., Physics Lab.
Northampton (N.S.W.C.).—Thursdays, 7 p.m., Allen's Pram Works, 8 Duke Street, Northampton.
Retford & Worksop (N.N.R.S.).—Tuesdays and Thursdays, 7.30 p.m., Club Rooms, Victoria Hall, Eastgate, Worksop, Notts.

REGION 6

Cheltenham.—First Thursday in each month, 8 p.m., Great Western Hotel, Clarence Street.
High Wycombe (Chiltern A.R.C.).—July 27 ("R.T.T.Y."), 8 p.m., British Legion Hall, St. Mary Street, High Wycombe.
Oxford (O. & D.A.R.S.).—July 26 (Ragchew), August 9, 7.30 p.m., Club Rooms, Cherwell Hotel, Watereaton Road, Oxford.
Stroud.—Wednesdays, 8 p.m., Subscription Rooms, Stroud.
Wolverton (W.D.R.C.).—Fridays, 7.30 p.m., Science and Arts Institute, Church Street.

REGION 7

Acton, Brentford and Chiswick.—July 18 ("S.s.b. Rig for Top Band" by G3NEH), 7.30 p.m., A.E.U. Rooms, 66 High Road, Chiswick.
Barnet (B. & D.R.C.).—July 25 ("S.s.b." by R. F. Stevens, G2BVN), 8 p.m., Red Lion Hotel, Barnet.
Bexleyheath (N.K.R.S.).—July 27, August 10, 8 p.m., Congregational Hall, Bexleyheath (nr. Clock Tower).
Croydon (S.R.C.C.).—August 8, 7.30 p.m., "Blacksmith Arms," South End, Croydon.
Dorking (D. & D.R.S.).—Second and fourth Tuesday each month, 8 p.m., Star and Garter Hotel, Dorking.
Ealing.—Sundays, 11 a.m., A.B.C. Restaurant, Ealing Broadway, W.5.
East Ham.—July 25 and fortnightly, 8 p.m., 12 Leigh Road, East Ham.
East Molesey (T.V.A.R.T.S.).—August 2, 8 p...m Carnarvon Castle Hotel, Hampton Court.

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Enfield and District.—July 27 ("Oscillators" by W. H. Allen, G2UJ), 7.30 p.m., George Spicer School, Southbury Road, Enfield.
Harlow and District.—Tuesdays, 7.30 p.m., rear of G3ERN (G. E. Read), High Street, Harlow.
Holloway (G.R.S.).—Closed for summer recess, club reopens September 8.
Ilford.—Thursdays, 8 p.m. 579 High Road, Ilford (near Seven Kings Station).
Kingston.—Lectures alternate Thursdays, Theory and Morse Classes weekly, 7.45 p.m., Y.M.C.A., Eden Street, Kingston (Morse at 2 Sunray Avenue, Tolworth.) July 27, "Electronics Applied to Railway Signalling."
New Cross (C.A.R.S.).—Fridays, 7.30 p.m., Sundays, 11.30 a.m., Wednesdays (Morse Practice), 8 p.m., 225 New Cross Road, London, S.E.14.
Norwood and South London (C.P. & D.R.C.). July 15 (N.F.D. Inquest), 8 p.m., Windermere House Annexe, Westow Street, Crystal Palace. August 1 (Morse Class, etc.) at G3IIR.
Paddington (P. & D.A.R.S.).—Wednesdays, 7.30 p.m., Beauchamp Lodge, 2 Warwick Crescent, W.2.
Romford (R. & D.R.S.).—Tuesdays, 8.15 p.m., R.A.F.A. House, 18 Carlton Road, Romford.
Southgate and Finchley.—No meeting in August.
Sutton and Cheam (S. & C.R.S.).—July 18 ("S.s.b." by G3CDJ), The Harrow, High Street, Cheam. No August meeting.

REGION 8

Crawley (C.A.R.C.).—July 26 ("Radar Simulation by G3JKF), 8 p.m., West Green Centre, August 9 (Informal), for details contact G3FRV.
Tunbridge Wells (W.K.A.R.S.).—July 21 (D/F Contest), 7.30 p.m., Culverden House, Culverden Park Road, Tunbridge Wells.

REGION 9

Bideford.—First Thursday in each month, 7.30 p.m., alternately at T. G. Ward (G2FKO), 38 Clovelly Road (phone: Bideford 964) and D. H. Jones (G3BO), Rosebank, Westcombe (phone: Bideford 550).
Bristol.—July 21, 7.15 p.m., Carwardine's Restaurant, Baldwin Street, Bristol 1.
Exeter.—Second Thursday in each month, 8 p.m., Y.M.C.A., St. David's Hill, Exeter.
Falmouth (F.R.C.).—First Wednesday in each month, Y.M.C.A., Falmouth.
Plymouth (P.R.C.).—Tuesdays, 7.30 p.m., Virginia House Settlement, St. Andrew's Cross.
Torquay (T.A.R.S.).—Second Saturday in each month, 7.30 p.m. (July, Quiz Programme), Y.M.C.A., The Castle, Torquay.
Weston-super-Mare.—First Tuesday in each month, 7.15 p.m., Technical College, Lower Church Road, Weston-super-Mare.
Yeovil (Y.A.R.C.).—Wednesdays, 7.30 p.m., Grove House, Preston Road, Yeovil.

REGION 10

Cardiff.—August 14, 7.30 p.m., T.A. Centre, Park Street, Cardiff.
Penarth.—Last Monday in each month, 7.30 p.m., R.A.F.A. Club, Windsor Road, Penarth.

REGION 14

Glasgow.—Second Friday in each month, 7.30 p.m., Woodside Halls, Clarendon Street, N.W. (near St. George's Cross Underground).
Motherwell.—Third Friday in each month, 7.30 p.m., Carfin Hall, Motherwell.
Prestwick.—Third Sunday in each month, 7.15 p.m., Royal Hotel, Prestwick.

REGION 16

Chelmsford.—First Tuesday in each month, 7.30 p.m., Marconi College, Arbour Lane, Chelmsford.

REGION 17

Southampton.—Second Saturday in each month, 7 p.m., Engineering Theatre, Lanchester Buildings, University of Southampton, University Road.

Regional and Club News

Bradford Radio Society. — At the A.G.M. the following were elected: *President:* L. A. F. Stockley (G3EKE); *Vice-President:* G. Dean (G3NPO); *Hon. Secretary:* Michael T. Powell (G3NNO), 28 Gledhow Avenue, Roundhay, Leeds 8; *Hon. Treasurer:* F. J. Davies (G3KSS); *Public Relations Officer:* D. Tovey (G3OUU). At the same meeting it was decided to omit the word " amateur " from the society's title. Meetings are held regularly at Cambridge House, 66 Little Horton Lane, Bradford 5.—see *Forthcoming Events.*

Bristol.—The June meeting held at Carwardine's Restaurant was devoted to an exhibition of and discussion on equipment built by local members. Among the items shown was a 70cm. video transmitter by G3NDT/T, a 2m transmitter by the T.R., G3KHA, a multiband table-top transmitter by G3MTG, a 100 kc/s crystal marker by B.R.S.19985, and a VQ4EV-type 144 Mc/s crystal controlled converter by A.1437. Julian Baldwin (A.1426) showed a film of last year's N.F.D. The Regional Representative, Reg. Griffin (G5UH), announced that it is hoped to include slow Morse practice in the next R.A.E. course at the Bristol College of Technology. *Hon. Secretary:* R. L. Shaddick (B.R.S.19727), 2 Shanklin Drive, Filton, Bristol.

Cambridge University Wireless Society.—P. N. Jarvis (G3OWJ) has been elected President and I. Sykes (G3OYW), Gonville and Caius College, Transmitting Secretary. Licensed amateurs and short wave listeners going up in October are invited to communicate with G3OYW.

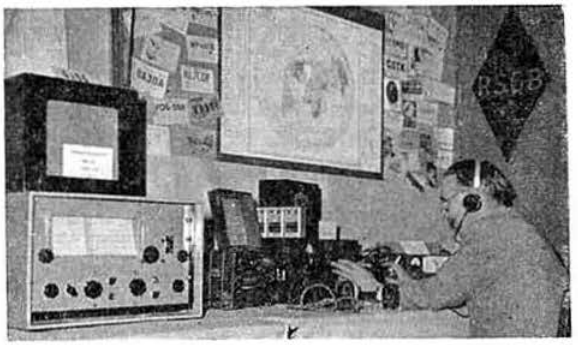
Cheltenham.—During weeks before and after August Bank Holiday, G2DUG, G3CEG, G3CGD, G3HCV, G3JFH and G3OLN will be operating from various Scottish counties on c.w. and phone on 1·8, 3·5, 7, 14 and 21 Mc/s and possibly 144 Mc/s under the call-sign GM5BK/P.

Clifton Amateur Radio Society.—On June 23, G3JKY gave a talk on portable operation. Transmitting field days are planned for July 23 (described as " all-in ") and September 17 (QRP). An improved 144 Mc/s aerial system is being constructed for the club station, G3GHN. *Acting Hon. Secretary:* E. Godsmark (G3IWL), 211 Manwood Road, Crofton Park, London, S.E.4.

Cornish Radio and Television Club.—At the June meeting, arrangements for the Mullard Award presentation were discussed and two colour films screened. Visitors are most welcome at meetings which are held on the first Wednesday in each month at the Y.M.C.A., Falmouth, commencing at 7.30 p.m. *Hon. Secretary:* W. J. Gilbert, 7 Poltair Road, Penryn, Cornwall.

Crawley Amateur Radio Club.—Members recently visited the Tatsfield Receiving Station of the B.B.C. At the meeting at the West Green Centre, Crawley, on July 26, K. Franklin (G3JKF) will give a talk on " Radar Simulation." *Hon. Secretary:* R. G. B. Vaughan (G3FRV), 9 Hawkins Road, Tilgate, Crawley.

East Kent Radio Society.—At the society's Technical Hobbies Exhibition in Canterbury the Williams Trophy was won by a short wave listener, R. Dale. In the open class, first prize went to G3MDO for an all-band s.s.b. transmitter. Other exhibits included a QSL display by G3LIG, a complete listener's shack by B. W. Rous and a typical workshop. The exhibition station GB3EKR made more than 400 contacts in 29 countries. *Hon. Secretary:* D. Williams (G3MDO), Seletar, New House Lane, Canterbury.



F. A. Bills (G3CLG), president of the Stourbridge and District Amateur Radio Society, operating G2OG/A at the Dudley Rotary Club's Youth Exhibition in May.

Grimsby Amateur Radio Society.—Courses in preparation for the R.A.E., Morse Test and in radio construction are being arranged for the autumn under the direction of G3HTI. A Junk Sale will be held at R.A.F.A., Abbey Drive, Grimsby, on July 21. *Hon. Secretary:* P. Mason, 213 Clee Road, Cleethorpes.

Harrow, Radio Society of.—A Junk Sale has been arranged for July 21. On Saturday, July 29, the society will be exhibiting a fully operational Amateur Transmitting station at the Gayton Fair, Harrow, and will be on the air from about 2 p.m. using the society's call-sign G3EFX/A. At the meeting on August 4, R. Ray (G2TA), will give Practical Aerial demonstrations. *Acting Hon. Secretary:* A. C. W. Biddell (G3GNM), 114 Kingshill Avenue, Kenton, Harrow.

Lichfield Amateur Radio Society.—Meetings are held on the first Monday and third Tuesday in each month at the Kings Head, Lichfield. Visitors and prospective members will be most welcome.

Mid-Lanarkshire Group.—At the June meeting GM3OLV gave a very informative talk on DX, illustrated with recordings. Meetings are held every Wednesday and on the third Friday in each month. *Hon. Secretary:* Ian Swan (A.2421), 50 Mouse Bank Road, Lanark.

Northern Heights Amateur Radio Society.—G2SU recently gave an interesting talk on his 50 years of radio. The meeting on July 26 will be informal—details of other activities are given in *Forthcoming Events. Hon. Secretary:* A. Robinson (G3MDW), Candy Cabin, Ogden, Halifax.

Paddington and District Amateur Radio Society.—The society is now licensed and active as G3PAD. Meetings are held every Wednesday—see *Forthcoming Events*—and membership continues to rise. *Hon. Secretary:* M. A. Lambert (G3LVK), 2 Warwick Crescent, London, W.2.

Purley and District Radio Club.—The following were elected at the A.G.M.: *Chairman:* R. L. Knight (G3DPW); *Hon. Treasurer:* M. Hubbard (G3OVL); *Hon. Secretary:* E. R. Honeywood (G3GKF), 105 Whytecliffe Road, Purley; *Committee Members:* K. Thomas (G3KVC), P. G. Hunt (G3KTA), J. M. Nisbet (G3OGO) and D. Wilson (G3OST). A club net is held on Top Band on Sundays at 20.00.

Reading Amateur Radio Club.—A talk on the May R.A.E. with typical answers to the questions was given at the June meeting by G3GKH, who is also to give a talk on power supplies at the meeting at the Palmer Hall, West Street, on July 29. *Hon. Secretary:* R. G. Nash (G3EJA), 9 Holybrook Road, Reading.

Redditch Amateur Radio Club.—Those interested in re-forming this club are invited to write to L. Hickingbotham (G3HZG), 95 Oakenshaw Road, Redditch, Worcs.

Reigate Amateur Transmitting Society.—At the June meeting G3FRV gave his first talk on s.s.b.—the second instalment is now eagerly awaited. On July 15, the society is due to operate an exhibition station at the Fuller's Earth Union Fete under either the call-sign G3FM/A or G3NKT/A. *Hon. Secretary:* F. D. Thom (G3NKT), 12 Willow Road, Redhill.

Rotherham Radio Club.—On June 21, G4BD gave an informative talk entitled " The Use of the Decibel " and on July 5 the club moved to new quarters at The Atlas Hotel, Brinsworth. At the Rotherham Show on August 7, three stations signing GB3RRS will be active on 144 Mc/s and 14, 21 and 28 Mc/s and on 1·8, 3·5 and 7 Mc/s from 8.30 a.m. All contacts will be acknowledged. QSL cards should be sent to G3MBQ. *Hon. Secretary:* S. J. Scarborough, 25 Crawshaw Avenue, Beauchief, Sheffield, 8.

Southgate and Finchley.—The group will be operating an exhibition station at the Wood Green Show on September 9-10. A recent lecture on RTTY by Dr. A. C. Gee (G2UK) was very interesting. Visitors are most welcome to attend meetings, details of which are given in *Forthcoming Events* under Region 7. *Group Secretary:* R. J. Pedder (G3NEE), 6 Greenall Close, Cheshunt, Herts.

South Shields and District Amateur Radio Club.—An exhibition station will be operated under the call-sign GB3SFS at the South Shields Flower Show on August 11-13, on 15-80m. Visitors will be very welcome. Meetings are held at Trinity House Social Centre, Laygate, every Friday and on the last Wednesday in each

month, commencing at 7.30 p.m. *Hon. Secretary:* D. Forster (G3KZZ), 41 Marlborough Street, South Shields.

Thames Valley Amateur Radio Transmitters' Society.—The June meeting was very well attended when G3HQX gave a talk on s.s.b., illustrated by demonstrations with a G2DAF type transmitter, and G2NH made an interesting contribution on crystal filters. The Junior Branch is expanding and N.F.D. was well supported. *Hon. Secretary:* K. Rogers (G3AIU), 21 Links Road, Epsom.

Torbay Amateur Radio Society.—An inquest on N.F.D. took place at the June meeting and G2GK gave a talk entitled "What's new in Amateur Radio." A quiz contest with Plymouth was due to take place on July 8. A "bucket and spade" party to Sidmouth is being arranged for August 13. *Hon. Secretary:* Mrs. G. L. Western (G3NQD), 118 Salisbury Avenue, Torquay.

Wirral Amateur Radio Society.—The society's temporary headquarters was to be moved to the Guide House, Balls Road, Birkenhead, early this month and a D/F Contest was due to be held on July 9. Plans are being made for another DXpedition. *Hon. Secretary:* A. Seed (G3FOO), 31 Withert Avenue, Bebington.

Newmarket Transistors Ltd. are now producing a **new range of high current power transistors** designated NKT401 to 404. These are germanium, *p-n-p* alloy junction types, the primary design applications being: NKT401, 24 volt d.c. converter; 402. 12 volt d.c. converter; 403, 24 volt power amplifier, and 404, 12 volt power amplifier. These may be considered as similar to the OC28, OC29, OC36 and OC35 respectively. The Newmarket types have peak current ratings of 8 amps and a beta of between 15 and 50. The maximum continuous junction temperature is 90° C, and the total maximum continuous dissipation is 12 watts when mounted on a heat sink of 16 s.w.g. aluminium measuring 7 in. by 7 in. These transistors have obvious applications in amateur mobile service and further details may be obtained from the manufacturers at Exning Road, Newmarket, Suffolk.

Taylor Instruments Ltd., Montrose Avenue, Slough, is now manufacturing **a new oscilloscope**, the Model 33a, designed to meet the demand for a high quality instrument for laboratory, television and radio service work. The hard time base covers 2 c/s to 100 kc/s and horizontal and vertical amplifiers with push-pull output are provided. The latter has a frequency range extending up to 60 Mc/s. A stabilized power supply is incorporated.

Taylor Electrical Instruments Ltd., are also manufacturing the Model 105A multirange testmeter with a **sensitivity of 20,000 o.p.v.** The instrument has 21 self-contained ranges: current readings from 60 μA to 12 amps in six ranges; d.c. from 0·3 to 1,200 volts in seven ranges, a.c. from 12 to 1,200 volts in five ranges and three resistance ranges covering 0-20 Megohms. The price of the Model 105A is £16; it is also available as the Model 105B with overload cutout at £18.

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EDDYSTONE 888, bandspread receiver £75
R.C.A. AR88D, 540 kc/s-32 Mc/s £65
GELOSO G209, Bandspread Receiver £65
R.C.A. AR88LF, 75-550 kc/s and 1·5-30 Mc/s £60
EDDYSTONE 750, 480-1, 450 kc/s and 1·7-32 Mc/s, double superhet £58
HALLICRAFTERS SX28, 550 kc/s-43 Mc/s £50
HALLICRAFTERS S36, U.H.F. AM/FM, 28-143 Mc/s £50
HAMMARLUND BC-794-B, 1250 kc/s-40 Mc/s, with power unit £50
MINIMITTER MR44 bandspread receiver £47
EDDYSTONE 840A, 480 kc/s-30 Mc/s £40
MINIMITTER MR37, bandspread receiver £40
HAMMARLUND Super Pro, with power unit £35
R.C.A. AR77E, 540 kc/s-31 Mc/s £32
EDDYSTONE 740, 540 kc/s-30 Mc/s £30
NATIONAL NC120, 540 kc/s-30 Mc/s £30
EDDYSTONE 870A, 150-380 kc/s and 510 kc/s-24 mc/s £28
BC-342-N, 1·5-18 Mc/s £25
R.M.E. 69, 550 kc/s-32 Mc/s £25
MARCONI CR100, 60-420 kc/s and 500 kc/s-30 Mc/s, with noise limiter £25
HALLICRAFTERS SKYRIDER 23, 540 kc/s-34 Mc/s £25
EDDYSTONE S640, 1·8-30 Mc/s £25
HALLICRAFTERS S20R, 550 kc/s-44 Mc/s £23
HALLICRAFTERS SX24, 550 kc/s-42 Mc/s £23
HALLICRAFTERS S38C, A.C./D.C., 550 kc/s-30 Mc/s £23
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